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Plant-Derived Fatty Acid Oils Group

CIR EXPERT PANEL MEETING

MARCH 3-4, 2011

Cosmetic Ingredient Review
Commitment . . . Credibility
Since 1976

Memorandum

To: CIR Expert Panel Members and Liaisons

From: Christina L. Burnett and Monice Fiume, Scientific Writers/Analysts

Date: February 10, 2011

Subject: Final Report of the Plant-Derived Fatty Acid Oils Group (Draft)

At the December 2010 meeting, the CIR Expert Panel reviewed the report on 244 plant-derived fatty acid oils. A Tentative Report was issued, with the conclusion that all of the oils included in the report, with the exception of those lacking chemical composition data, were safe as used. Those lacking chemical composition data had insufficient data to make a determination of safety. The Panel agreed that, with receipt of chemical composition data, those ingredients that had insufficient data would be considered safe as used.

At the time of the December meeting, 10 ingredients had insufficient data. Currently, with the inclusion of new published and unpublished data, 241 of the 244 of the oils are safe as used. The three oils with insufficient data are:

Fragaria Chiloensis (Strawberry) Seed Oil
Fragaria Vesca (Strawberry) Seed Oil
Fragaria Virginiana (Strawberry) Seed Oil

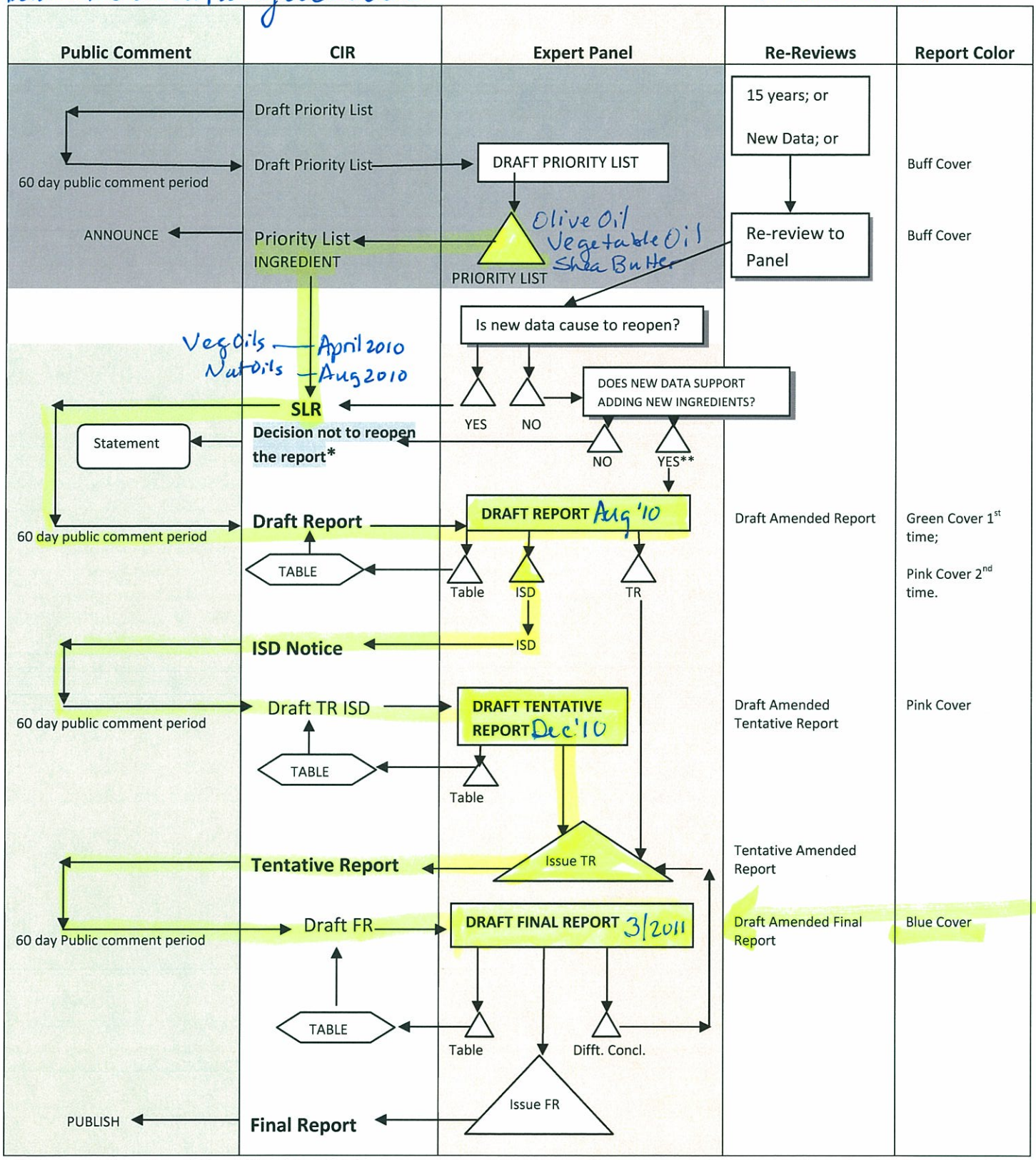
The unpublished data submitted by the Council, as listed below, are included in Tab 3 of this report:

1. Composition of Orbignya Speciosa Kernel Oil. Memo dated Jan. 10, 2011.
2. Composition of Lycium Barbarum Seed Oil. Memo dated Jan. 18, 2011.
3. Updated Concentration of Use Information Plant Oils. Memo dated Jan. 20, 2011.

The Panel should anticipate issuing a Final Report at this meeting.

SAFETY ASSESSMENT FLOW CHART

Plant Derived Fatty Acid Oils — March 2011



*The CIR Staff notifies of the public of the decision not to re-open the report and prepares a draft statement for review by the Panel. After Panel review, the statement is issued to the Public.

**If rDraft Amended Report (DAR) is available, the Panel may choose to review; if not, CIR staff prepares DAR for Panel Review.

△ Expert Panel Decision

▭ Document for Panel Review

Updated Search (Jan 20, 2011) - focus was on insufficient ingredients

((ORYZA AND SATIVA) OR RICE) AND BRAN AND OIL

SCLEROCARYA AND BIRREA AND SEED AND OIL

(((ARCTIUM AND LAPPA) OR (COIX AND LACRYMA) OR ((FRAGARIA AND (CHILOENSIS OR VESCA OR VIRGINIANA)) OR (MORINDA AND CITRIFOLIA) AND SEED)) OR (SCHINZIOPHYTON AND RAUTANENII AND KERNEL) AND OIL)

Ingredients	Toxline PubMed	ChemIDplus	HSDB	CAplus	NTIS	HPV	Merck USP
	√	√	√	√	√	√	√

Additional searches were performed on USDA's GRIN and AGRICOLA databases and via general search engines.

Ingredients were searched by Latin botanical (INCI) names, common names, and CAS numbers, when available. The list of ingredients searched is found in Table 1 of the vegetable oil report.

Literature searches included chemical composition, fatty acid composition, dermal toxicity, irritation, and sensitization qualifiers.

Searches were performed between November 20, 2009 and March 30, 2010; June 30 through July 8, 2010; and updated September 1through October 15, 2010.

March 2010:
CAS No. Except for Coconut, Corn, and Sesame - ***too big***

(68956-68-3 OR 68334-28-1 OR 68956-68-3 OR 8001-29-4 OR 68308-51-0 OR 68334-00-9 OR 8001-25-0 OR 92044-96-7 OR 156798-12-8 OR 8002-75-3 OR 8023-79-8 OR 8033-29-2 OR 68514-74-9 OR 68990-82-9 OR 84540-04-5 OR 8002-75-3 OR 61790-79-2 OR 61789-89-7 OR 8002-03-7 OR 68425-36-5 OR 91051-35-3 OR 8002-13-9 OR 84681-71-0 OR 8002-13-9 OR 120962-03-0 OR 8001-23-8 OR 8001-22-7 OR 91770-67-1 OR 8016-70-4 OR 8001-21-6 OR 84625-38-7 OR 8016-49-7 OR 97676-19-2 OR 225234-12-8 OR 72869-69-3 OR 923029-60-1 OR 8024-32-6 OR 91770-40-0 OR 91078-92-1 OR 8002-31-1 OR 192230-28-7 OR 8001-21-6 OR 68424-45-3 OR 8024-22-4 OR 68553-81-1 OR 84696-37-7 OR 93165-33-4 OR 8006-95-9 OR 68917-73-7 OR 68938-32-9 OR 394236-97-6 OR 68920-03-6 OR 194043-92-0 OR 225234-14-0 OR 70955-25-8 OR 8015-88-1 OR 8002-78-6 OR 8023-98-1 OR 85085-28-5) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERG*)

All CAS No. Except for Coconut, Corn, Sesame, Pumpkin, BlackCurrant, Burago, Artichoke, Babassu, Dika, Grapeseed, Capuacu, Cucumber, Carrot - ***505***

(68956-68-3 OR 68334-28-1 OR 68956-68-3 OR 8001-29-4 OR 68308-51-0 OR 68334-00-9 OR 8001-25-0 OR 92044-96-7 OR 156798-12-8 OR 8002-75-3 OR 8023-79-8 OR 8033-29-2 OR 68514-74-9 OR 68990-82-9 OR 84540-04-5 OR 8002-75-3 OR

61790-79-2 OR 61789-89-7 OR 8002-03-7 OR 68425-36-5 OR 91051-35-3 OR 8002-13-9 OR 84681-71-0 OR 8002-13-9 OR 120962-03-0 OR 8001-23-8 OR 8001-22-7 OR 91770-67-1 OR 8016-70-4 OR 8001-21-6 OR 84625-38-7 OR 72869-69-3 OR 8024-32-6 OR 91770-40-0 OR 8002-31-1 OR 8001-21-6 OR 68424-45-3 OR 68553-81-1 OR 84696-37-7 OR 93165-33-4 OR 8006-95-9 OR 68917-73-7 OR 68938-32-9 OR 68920-03-6 OR 194043-92-0 OR 225234-14-0 OR 8002-78-6 OR 8023-98-1 OR 85085-28-5) AND (SENSITIZ* OR SENSITIS*OR IRRITA* OR ALLERG*)

CAS No. - Pumpkin, Black Currant, Burago, Artichoke, Babassu, Diks, Grapeseed, Capuacu, Cucumber, Carrot - ***103***

(8016-49-7 OR 97676-19-2 OR 225234-12-8 OR 923029-60-1 OR 91078-92-1 OR 192230-28-7 OR 8024-22-4 OR 394236-97-6 OR 70955-25-8 OR 8015-88-1) AND (SENSITIZ* OR SENSITIS*OR IRRITA* OR ALLERG*)

All CAS No. Except for Coconut, Corn, Cottonseed, Palm, Peanut, Sesame, and Rice - ***635***

(68956-68-3 OR 68334-28-1 OR 68956-68-3 OR 8001-25-0 OR 92044-96-7 OR 156798-12-8 OR 8002-75-3 OR 61790-79-2 OR 61789-89-7 OR 8002-13-9 OR 84681-71-0 OR 8002-13-9 OR 120962-03-0 OR 8001-23-8 OR 8001-22-7 OR 91770-67-1 OR 8016-70-4 OR 8001-21-6 OR 84625-38-7 OR 8016-49-7 OR 97676-19-2 OR 225234-12-8 OR 72869-69-3 OR 923029-60-1 OR 8024-32-6 OR 91770-40-0 OR 91078-92-1 OR 8002-31-1 OR 192230-28-7 OR 8001-21-6 OR 68424-45-3 OR 8024-22-4 OR 8006-95-9 OR 68917-73-7 OR 68938-32-9 OR 394236-97-6 OR 68920-03-6 OR 194043-92-0 OR 225234-14-0 OR 70955-25-8 OR 8015-88-1 OR 8002-78-6 OR 8023-98-1 OR 85085-28-5) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERG*)

CAS No. - Coconut, Corn, Sesame – since 2005 - ***28***

(8001-31-8 OR 61788-47-7 OR 68938-18-8 OR 84836-98-6 OR 61789-30-8 OR 61789-31-9 OR 8001-30-7 OR 68308-50-9 OR 61789-23-9 OR 8008-74-0) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERG*)

CAS No. – Cottonseed, Palm, Peanut - since 1997 - ***55***

(8001-29-4 OR 68308-51-0 OR 68334-00-9 OR 8002-75-3 OR 8023-79-8 OR 8033-29-2 OR 68514-74-9 OR 68990-82-9 OR 84540-04-5 OR 8002-03-7 OR 68425-36-5 OR 91051-35-3) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERG*)

CAS No. – Rice – since 2003 - ***4***

(68553-81-1 OR 84696-37-7 OR 93165-33-4) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERG*)

Terms - Coconut, Olive, Palm - ***627***

((COCOS OR COCONUT) AND SEED AND BUTTER) OR ((HYDROGENATED OR UNSAPONIFIABLE OR HUSK) AND (OLIVE OR OLEA) AND OIL) OR ((PALM OR ELAEIS) AND (BUTTER OR ACID)) OR (((ELAEIS AND OLEIFERA) OR PALM) AND KERNEL AND OIL) OR ((POTASSIUM OR SODIUM) AND (PALMATE OR KERNELATE)) AND (SENSITIZ* OR SENSITIS*OR IRRITA* OR ALLERGE* OR ALLERGI*)

Terms – Peanut, Rapeseed, Sesame - ***17***

(((POTASSIUM OR SODIUM) AND PEANUTATE) OR ((BRASSICA AND CAMPESTRIS) OR RAPESEED AND OIL AND

UNSAPONIFIABLE) OR ((POTASSIUM OR SODIUM) AND RAPESEEDATE) OR (RAPESEED AND ACID) OR ((HYDROGENATED OR UNSAPONIFIABLE) AND CANOLA AND OIL) OR (((SESAMUM AND INDICUM) OR SESAME) AND SEED AND BUTTER)) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERGI* OR ALLERGE*)

Terms – Safflower, Sunflower, Pumpkin, Acai - ***5***

((HYDROGENATED AND SAFFLOWER AND SEED AND OIL) OR (SAFFLOWER AND ACID) OR ((POTASSIUM OR SODIUM) AND SAFFLOWERATE) OR (((HELAINTHUS AND ANNUUS) OR SUNFLOWER) AND (HYDROGENATED OR UNSAPONFIABLE) AND SEED AND OIL) OR (HYDROGENATED AND (PUMPKIN OR (CUCURBITA AND PEPO)) AND SEED AND OIL) OR ((ACAI OR (EUTERPE AND OLERACEA)) AND FRUIT AND OIL)) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERGI* OR ALLERGE*)

Terms – Watermelon, Black Currant, Currant, Borage, Evening Primrose - ***2***

(((WATERMELON OR (CITRULLUS AND VULGARIS)) AND SEED AND OIL) OR (HYDROGENATED AND ((BLACK AND CURRANT) OR (RIBES AND NIGRUM)) AND SEED AND OIL) OR (((RIBES AND RUBRUM) OR CURRANT) AND SEED AND OIL) OR ((BORAGE OR (BORAGO AND OFFICINALIS)) AND SEED AND OIL) OR (((EVENING AND PRIMROSE) OR (OENTHERA AND BIENNIS)) AND OIL)) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERGI OR ALLERGE*)

Terms - Amaranth, Apricot Kernel, Apple, Argan, Avocado - ***6***

(((AMARANTH OR (AMARANTHUS AND HYPOCHONDRIACUS)) AND SEED AND OIL) OR ((APRICOT OR (PRUNUS AND ARMENIACA)) AND (HYDROGENATED OR UNSAPONIFIABLE) AND KERNEL AND OIL) OR ((APPLE OR (PYRUS AND MALUS)) AND OIL) OR ((ARGAN OR (ARGANIA AND SPINOSA)) AND KERNEL AND OIL) OR (AVOCADO OR (PERSEA AND GRATISSIMA)) AND (BUTTER OR (HYDROGENATED AND OIL)) OR (SODIUM AND AVOCADOATE)) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERGI OR ALLERGE*)

Terms – Babassu, Ben, Cocoa, Cohune, False Flax - ***0***

((BABASSU AND ACID) OR ((POTASSIUM OR SODIUM) AND BABASSUATE) OR (MORINGA AND (OLEIFERA OR PTERYGOSPERMA) AND SEED AND OIL) OR (SODIUM AND (COCOA OR (THEOBROMA AND CACAO)) AND BUTTERATE) OR ((COHUNE OR (ORGIBNYA AND COHUNE)) AND SEED AND OIL) OR (((FALSE AND FLAX) OR (CAMELINA AND SATIVA)) AND SEED AND OIL)) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERGI* OR ALLERGE*)

Terms – Grapeseed, Marula, Meadowfoam, Papaya, Perilla, Pequi, Prune/Plum - ***2***

((((GRAPE AND SEED) OR GRAPESEED OR (VITIS AND VINIFERA)) AND HYDROGENATED AND OIL) OR (SODIUM AND GRAPESEEDATE) OR ((MARULA OR (SCLEROCARYA AND BIRREA)) AND SEED AND OIL) OR ((MEADOWFOAM OR (LIMNANTHES AND ALBA)) AND SEED AND OIL)OR ((PAPAYA OR CARICA) AND SEED AND OIL) OR ((PERILLA OR OCYMOIDES) AND SEED AND OIL) OR ((PEQUI OR (CARYOCAR AND BRASILIENSE)) AND FRUIT AND OIL) OR ((PRUNE OR PLUM OR (PRUNUS AND DOMESTICA)) AND SEED AND OIL)) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERGI* OR ALLERGE*)

Terms - Quinoa, Ramtil, Rice, Sacha, Tea Seed, Thistle - ***2***

(((QUINOA OR CHENOPODIUM) AND SEED AND OIL) OR ((RAMTIL OR (GUIZOTIA AND ABYSSINICA)) AND SEED AND OIL) OR ((RICE OR (ORYZA AND SATIVA)) AND ((HYDROGENATED AND BRAN) OR SEED) AND OIL) OR (((SACHA AND INCHI) OR (PLUKENETIA AND VOLUBILIS)) AND SEED AND OIL) OR (((TEA AND SEED) OR (CAMELLIA AND OLEIFERA)) AND SEED AND OIL) OR ((THISTLE OR (SILYBUM AND MARIANUM)) AND SEED AND OIL)) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERGI* OR ALLERGE*)

Terms – Tomato, Wheat, Kiwi, Baobab, Wild Celery, Burdock - ***6***

(((TOMATO OR (SOLANUM AND LYCOPERSICUM))AND (SEED OR FRUIT) AND OIL) OR ((WHEAT OR (TRITICUM AND VULGARE)) AND GERM AND (HYDROGENATED OR UNSAPONIFIABLE) AND OIL) OR ((KIWI OR (ACTINIDIA AND CHINENSIS)) AND SEED AND OIL) OR ((BAOBAB OR (ADANSONIA AND DIGITATA)) AND OIL) OR (((WILD AND CELERY) OR (ANGELICA AND ARCHANGELICA)) AND SEED AND OIL) OR ((BURDOCK OR (ARCTIUM AND LAPPA)) AND SEED AND OIL)) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERGI* OR ALLERGE*)

Terms – Murumuru, Kaya, Cupuacu, Broccoli, Oat Kernel - ***3***

(((MURUMURU OR ASTROCARYUM) AND SEED AND BUTTER) OR (SODIUM AND ASTROCARYUM AND MURUMURU) OR ((KAYA OR (TORREYA AND NUCIFERA)) AND SEED AND OIL) OR ((CAPUACU OR (THEOBROMA AND GRANDIFLORUM)) AND SODIUM AND SEEDATE) OR ((BROCCOLI OR (BRASSICA AND OLERACEA AND ITALICA)) AND SEED AND OIL) OR ((OAT OR (AVENA AND SATIVA)) AND KERNEL AND OIL)) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERGI* OR ALLERGE*)

Terms – Shea, Job’s Tears, Cucumber, Carrot, Strawberry, Cranberry - ***2***

(((SHEA OR (BUTYROSPERMUM AND PARKII)) AND OIL) OR (((JOBS AND TEARS) OR (COIX AND LACRYMA AND JOBI)) AND SEED AND OIL) OR ((CUCUMER OR (CUCUMIS AND SATIVUS)) AND OIL) OR ((CARROT OR (DAUCUS AND CAROTA AND SATIVA)) AND SEED AND OIL) OR ((STRAWBERRY OR (FRAGARIA AND (ANANASSA OR CHILOENSIS OR VESCA OR VIRGINIANA))) AND SEED AND OIL) OR ((CRANBERRY OR (VACCINIUM AND MACROCARPON)) AND SEED AND OIL)) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERGI* OR ALLERGE*)

Terms – Peach Kernel, Raspberry, Mango, Sweet Cherry, Orange, Lime, Grapefruit - ***3***

(((PEACH OR (PRUNUS AND PERSICA)) AND HYDROGENATED AND KERNEL AND OIL) OR ((RASPBERRY OR (RUBUS AND IDAEUS)) AND SEED AND OIL) OR ((MANGO OR (MANGIFERA AND INDICA)) AND SEED AND (OIL OR BUTTER)) OR (SODIUM AND MANGOSEEDATE) OR (((SWEET AND CHERRY) OR (PRUNUS AND AVIUM)) AND SEED AND OIL) OR ((ORANGE OR (CITRUS AND AURANTIUM AND DULCIS)) AND SEED AND OIL) OR ((LIME OR (CITRUS AND AURANTIFOLIA)) AND SEED AND OIL) OR ((GRAPEFRUIT OR (CITRUS AND (GRANDIS OR PARADISI))) AND SEED AND OIL)) AND (SENSITIZ* OR SENSITIS* OR IRRITA* OR ALLERGI* OR ALLERGE*)

Oils Data Profile* – March 2011 – Writers, Christina Burnett and Monice Fiume (updated 1/21/2011)							
	Previously Reviewed	Reported Use	Chemical Properties	Fatty Acid Composition	Irritation/ Sensitization- Animal	Irritation/ Sensitization- Clinical	Ocular Irritation
Actinidia Chinensis (Kiwi) Seed Oil		X	X	X			
Adansonia Digitata Oil		X	X	X			
Adansonia Digitata Seed Oil					X	X	X
Hydrogenated Adansonia Digitata Seed Oil							
Aleurities Moluccana Seed Oil		X	X	X		X	X
Hydrogenated Kukui Nut Oil							
Aleurites Moluccanus Bakoly Seed Oil							
Amaranthus Hypochondriacus Seed Oil				X			
Anacardium Occidentale (Cashew) Seed Oil		X	X	X			
Arachis Hypogaea (Peanut) Oil	X	X	X	X	X	X	
Hydrogenated Peanut Oil	X	X					
Potassium Peanutate							
Sodium Peanutate							
Peanut Acid	X						
Arctium Lappa Seed Oil				X			
Argania Spinosa Kernel Oil		X	X	X		X	
Hydrogenated Argania Spinosa Kernel Oil							
Astrocaryum Murumuru Seed Butter		X	X	X		X	
Sodium Astrocaryum Murumuruate		X					
Avena Sativa (Oat) Kernel Oil		X	X	X		X	
Bassia Butyracea Seed Butter				X			
Bassia Latifolia Seed Butter		X		X		X	
Bertholletia Excelsa Seed Oil		X	X	X			
Borago Officinalis Seed Oil		X	X	X		X	
Brassica Campestris (Rapeseed) Seed Oil		X	X	X			
Brassica Campestris (Rapeseed) Oil Unsaponifiables							
Hydrogenated Rapeseed Oil		X	X	X		X	
Rapeseed Acid				X			
Potassium Rapeseedate							
Sodium Rapeseedate							
Brassica Napus Seed Oil				X			
Brassica Oleracea Acephala Seed Oil			X	X			
Brassica Oleracea Italica (Broccoli) Seed Oil		X	X	X		X	
Butyrospermum Parkii (Shea) Oil		X	X	X			
Butyrospermum Parkii (Shea) Butter		X	X	X	X	X	X
Butyrospermum Parkii (Shea) Butter Unsaponifiables		X					
Hydrogenated Shea Butter		X					
Camelina Sativa Seed Oil		X		X		X	
Hydrogenated Camelina Sativa Seed Oil							
Camellia Japonica Seed Oil		X		X			
Camellia Kissi Seed Oil		X		X			
Camellia Oleifera Seed Oil		X	X	X			
Hydrogenated Camellia Oleifera Seed Oil		X					
Camellia Sinensis Seed Oil		X		X		X	
Canarium Indicum Seed Oil			X	X			
Canola Oil		X	X	X		X	
Canola Oil Unsaponifiables		X					
Hydrogenated Canola Oil		X					
Carica Papaya Seed Oil		X	X	X			
Carthamus Tinctorius (Safflower) Seed Oil	X	X	X	X	X	X	
Hydrogenated Safflower Seed Oil							
Potassium Safflowerate							
Sodium Safflowerate							
Safflower Acid							
Carya Illinoensis (Pecan) Seed Oil			X	X			
Caryocar Brasiliense Fruit Oil		X	X	X		X	
Chenopodium Quinoa Seed Oil		X		X		X	
Citrullus Lanatus (Watermelon) Seed Oil		X	X	X		X	
Citrus Aurantifolia (Lime) Seed Oil			X	X			
Citrus Aurantifolia (Lime) Seed Oil Unsaponifiables							
Hydrogenated Lime Seed Oil							
Hydrogenated Lime Seed Oil Unsaponifiables							
Citrus Aurantium Dulcis (Orange) Seed Oil			X	X			
Citrus Aurantium Dulcis (Orange) Seed Oil Unsaponifiables							

Oils Data Profile* – March 2011 – Writers, Christina Burnett and Monice Fiume (updated 1/21/2011)							
	Previously Reviewed	Reported Use	Chemical Properties	Fatty Acid Composition	Irritation/ Sensitization- Animal	Irritation/ Sensitization- Clinical	Ocular Irritation
Hydrogenated Orange Seed Oil							
Hydrogenated Orange Seed Oil Unsaponifiables							
Citrus Grandis (Grapefruit) Seed Oil		X		X			
Citrus Grandis (Grapefruit) Seed Oil Unsaponifiables							
Hydrogenated Grapefruit Seed Oil							
Hydrogenated Grapefruit Seed Oil Unsaponifiables							
Citrus Paradisi (Grapefruit) Seed Oil		X	X	X			
Citrus Limon (Lemon) Seed Oil				X			
Cocos Nucifera (Coconut) Oil	X	X	X	X	X	X	X
Hydrogenated Coconut Oil	X	X			X	X	X
Cocos Nucifera (Coconut) Seed Butter							
Magnesium Cocoate	X	X					
Potassium Cocoate	X	X				X	
Potassium Hydrogenated Cocoate	X						
Sodium Cocoate	X	X			X		
Sodium Hydrogenated Cocoate	X						
Coconut Acid	X	X			X		X
Hydrogenated Coconut Acid	X	X					
Coix Lacryma-Jobi (Job's Tears) Seed Oil				X			
Corylus Americana (Hazel) Seed Oil	X	X		X			
Hydrogenated Hazelnut Oil							
Corylus Avellana (Hazel) Seed Oil	X	X	X	X	X	X	
Crambe Abyssinica Seed Oil		X		X	X	X	X
Cucumis Sativus (Cucumber) Seed Oil		X		X			
Cucurbita Pepo (Pumpkin) Seed Oil		X	X	X			
Hydrogenated Pumpkin Seed Oil							
Cynara Cardunculus Seed Oil				X			
Elaeis Guineensis (Palm) Oil	X	X	X	X	X	X	X
Elaeis Guineensis (Palm) Kernel Oil	X	X	X	X			
Hydrogenated Palm Kernel Oil	X	X					
Elaeis (Palm) Oil							
Hydrogenated Palm Oil	X	X					X
Elaeis Guineensis (Palm) Butter							
Palm Kernel Acid		X					
Potassium Palm Kernelate		X					
Potassium Palmate		X					
Potassium Hydrogenated Palmate							
Sodium Palm Kernelate		X				X	
Sodium Palmate		X				X	
Sodium Hydrogenated Palmate							
Palm Acid		X					
Hydrogenated Palm Acid							
Elaeis Oleifera Kernel Oil		X		X			
Euterpe Oleracea Fruit Oil		X		X		X	
Fragaria Ananassa (Strawberry) Seed Oil			X	X			X
Fragaria Chiloensis (Strawberry) Seed Oil							
Fragaria Vesca (Strawberry) Seed Oil							
Fragaria Virginiana (Strawberry) Seed Oil							
Garcinia Indica Seed Butter		X	X	X		X	
Gevuina Avellana Oil		X		X			
Genuina Avellana Seed Oil							
Glycine Soja (Soybean) Oil		X	X	X			
Glycine Soja (Soybean) Oil Unsaponifiables		X				X	
Hydrogenated Soybean Oil		X				X	
Soy Acid							
Potassium Soyate							
Sodium Soyate							
Gossypium Herbaceum (Cotton) Seed Oil	X	X	X	X	X	X	
Hydrogenated Cottonseed Oil	X	X				X	X
Cottonseed Acid	X						
Guizotia Abyssinica Seed Oil			X	X			
Helianthus Annuus (Sunflower) Seed Oil		X	X	X		X	
Helianthus Annuus (Sunflower) Seed Oil Unsaponifiables		X				X	
Hydrogenated Sunflower Seed Oil		X					

Oils Data Profile* – March 2011 – Writers, Christina Burnett and Monice Fiume (updated 1/21/2011)							
	Previously Reviewed	Reported Use	Chemical Properties	Fatty Acid Composition	Irritation/ Sensitization- Animal	Irritation/ Sensitization- Clinical	Ocular Irritation
Sunflower Seed Acid				X			
Hippophae Rhamnoides Oil		X					
Hippophae Rhamnoides Fruit Oil		X	X	X			
Hippophae Rhamnoides Seed Oil			X	X	X	X	X
Irvingia Gabonensis Kernel Butter		X	X	X		X	
Juglans Regia (Walnut) Seed Oil		X	X	X			
Limnanthes Alba (Meadowfoam) Seed Oil		X		X		X	
Hydrogenated Meadowfoam Seed Oil							
Linum Usitatissimum (Linseed) Seed Oil		X	X	X		X	X
Linseed Acid		X					
Luffa Cylindrica Seed Oil		X		X		X	
Lupinus Albus Seed Oil		X		X			
Lupinus Albus Oil Unsaponifiables							
Lycium Barbarum Seed Oil		X		X			
Macadamia Integrifolia Seed Oil		X	X	X			
Hydrogenated Macadamia Seed Oil							
Macadamia Ternifolia Seed Oil		X	X			X	
Sodium Macadamiaseedate							
Mangifera Indica (Mango) Seed Oil		X	X	X		X	
Mangifera Indica (Mango) Seed Butter		X				X	
Sodium Mangoseedate		X					
Morinda Citrifolia Seed Oil				X			
Moringa Oleifera Seed Oil		X	X	X		X	
Moringa Pterygosperma Seed Oil		X				X	
Oenothera Biennis (Evening Primrose) Oil		X	X	X		X	
Hydrogenated Evening Primrose Oil		X					
Olea Europea (Olive) Fruit Oil .		X	X	X	X	X	X
Olea Europaea (Olive) Oil Unsaponifiables		X					
Hydrogenated Olive Oil		X				X	
Hydrogenated Olive Oil Unsaponifiables		X				X	
Potassium Olivate		X					
Sodium Olivate		X				X	
Olea Europaea (Olive) Husk Oil			X	X			
Olive Acid				X			
Orbignya Cohune Seed Oil		X		X			
Orbignya Oleifera Seed Oil		X	X	X		X	
Potassium Babassuate							
Sodium Babassuate		X					
Babassu Acid							
Orbignya Speciosa Kernel Oil		X		X		X	
Oryza Sativa (Rice) Bran Oil	X	X	X	X	X	X	X
Hydrogenated Rice Bran Oil							
Oryza Sativa (Rice) Germ Oil	X	X		X	X		X
Oryza Sativa (Rice) Seed Oil							
Rice Bran Acid	X						
Passiflora Edulis Seed Oil		X	X	X			
Hydrogenated Passiflora Edulis Seed Oil							
Perilla Ocymoides Seed Oil		X		X			
Persea Gratissima (Avocado) Oil	X	X	X	X		X	
Persea Gratissima (Avocado) Oil Unsaponifiables		X					
Hydrogenated Avocado Oil		X					
Persea Gratissima (Avocado) Butter	X	X					
Sodium Avocadoate		X					
Pistacia Vera Seed Oil		X	X	X			
Hydrogenated Pistachio Seed Oil							
Plukenetia Volubilis Seed Oil		X	X	X		X	
Prunus Amygdalus Dulcis (Sweet Almond) Oil	X	X	X	X	X	X	X
Prunus Amygdalus Dulcis (Sweet Almond) Oil Unsaponifiables							
Hydrogenated Sweet Almond Oil		X					
Hydrogenated Sweet Almond Oil Unsaponifiables							
Sodium Sweet Almondate		X					
Prunus Armeniaca (Apricot) Kernel Oil		X	X	X		X	
Prunus Armeniaca (Apricot) Kernel Oil Unsaponifiables							
Hydrogenated Apricot Kernel Oil		X					

Oils Data Profile* – March 2011 – Writers, Christina Burnett and Monice Fiume (updated 1/21/2011)							
	Previously Reviewed	Reported Use	Chemical Properties	Fatty Acid Composition	Irritation/ Sensitization- Animal	Irritation/ Sensitization- Clinical	Ocular Irritation
Hydrogenated Apricot Kernel Oil Unsaponifiables							
Prunus Avium (Sweet Cherry) Seed Oil		X	X	X			
Prunus Domestica Seed Oil		X	X	X		X	
Prunus Persica (Peach) Kernel Oil		X	X	X		X	
Hydrogenated Peach Kernel Oil							
Punica Granatum Seed Oil		X	X	X			
Hydrogenated Punica Granatum Seed Oil							
Pyrus Malus (Apple) Seed Oil		X	X	X			
Ribes Nigrum (Black Currant) Seed Oil		X	X	X		X	X
Hydrogenated Black Currant Seed Oil							
Ribes Rubrum (Currant) Seed Oil			X	X			
Rosa Canina Fruit Oil		X				X	
Hydrogenated Rosa Canina Fruit Oil							
Rubus Chamaemorus Seed Oil		X	X	X		X	X
Rubus Idaeus (Raspberry) Seed Oil		X	X	X		X	
Hydrogenated Raspberry Seed Oil							
Schinziophyton Rautanenii Kernel Oil		X	X	X			
Sclerocarya Birrea Seed Oil		X	X	X			
Sesamum Indicum (Sesame) Seed Oil	X	X		X	X	X	X
Sesamum Indicum (Sesame) Oil Unsaponifiables	X	X					
Hydrogenated Sesame Seed Oil	X						
Sesamum Indicum (Sesame) Seed Butter							
Sodium Sesameseedate	X						
Silybum Marianum Seed Oil [Thistle]		X		X			
Solanum Lycopersicum (Tomato) Fruit Oil		X		X			
Solanum Lycopersicum (Tomato) Seed Oil		X	X	X		X	
Theobroma Cacao (Cocoa) Seed Butter		X	X	X		X	
Sodium Cocoa Butterate							
Theobroma Grandiflorum Seed Butter		X		X		X	
Sodium Theobroma Grandiflorum Seedate							
Torreya Nucifera Seed Oil				X			
Triticum Vulgare (Wheat) Germ Oil	X	X		X	X	X	X
Triticum Aestivum (Wheat) Germ Oil							
Triticum Vulgare (Wheat) Germ Oil Unsaponifiables		X					
Hydrogenated Wheat Germ Oil Unsaponifiables							
Hydrogenated Wheat Germ Oil							
Wheat Germ Acid		X					
Vaccinium Corymbosum (Blueberry) Seed Oil			X	X			
Vaccinium Macrocarpon (Cranberry) Seed Oil		X	X	X		X	
Hydrogenated Cranberry Seed Oil							
Vaccinium Myrtillus Seed Oil		X	X	X		X	
Vaccinium Vitis-Idaea Seed Oil		X	X	X		X	X
Vegetable (Olus) Oil		X		X		X	
Hydrogenated Vegetable Oil		X					
Vitis Vinifera (Grape) Seed Oil		X	X	X		X	
Hydrogenated Grapeseed Oil		X				X	
Sodium Grapeseedate		X					
Zea Mays (Corn) Oil	X	X	X	X	X	X	X
Zea Mays (Corn) Oil Unsaponifiables	X	X					
Zea Mays (Corn) Germ Oil	X	X					
Potassium Cornate	X						
Corn Acid	X						

*"X" indicates that data were available in a category for the ingredient

with a tentative report.

DR. BERGFELD: May I ask a question as the chair? And that is, the read-across information, is there a need to do anything in the discussion regarding it?

DR. BELSITO: I think that should go in almost all discussions because there probably is not a single ingredient family we're looking at where we're not using read-across.

DR. BERGFELD: So, to reiterate, the read-across boilerplate specifics should go into the discussion for each of our ingredients? Okay. If there's no other discussion then I'll call for the vote. All those in favor indicate by raising your hand.

Unanimous. Thank you. The next large group is by Dr. Marks, the edible oils as stated here. Now the oils.

DR. MARKS: Well, there are 244 plant-derived oils. We felt that the title of this report could be changed to plant-derived fatty acid oils and in reviewing the data we had, we felt we could move forward with a tentative report with a conclusion that these fatty acid oils are safe. And that's a move that these are safe.

DR. BERGFELD: Is there a second or discussion? Don?

DR. BELSITO: Well, there were, by our count, approximately 10, I believe, particular plant-derived oils for which we didn't have fatty acid composition, and we were going to go insufficient on those until we knew what the composition was. And I can read them if you want. Arctium lappa seed oil, the Citrus paradisi, which is a different cultivar of the grapefruit than the one we had information on, the Coix lacryma-jobi seed oil, the three different cultivars of strawberry, Fragaria chiloensis, Fragaria vesca, Fragaria virginiana, for which we didn't have amino acid -- or fatty acid composition. Lycium barbarum seed oil, Morinda citrifolia seed oil, Orbignya speciosa kernel oil, Schinziophyton rautanenii kernel oil, and those were the ones that we didn't have fatty acid composition.

DR. MARKS: We had a discussion about whether the fatty acid composition was necessary or not, so we went one step back in saying is this really necessary, and finally deciding on the safety of those oils where it was missing. And if I capture the team's discussion, we felt it wasn't, but if the concern was the arachidonic acid level, say, that we don't know that level, we have rice as a prototype, that contains 5 percent arachidonic acid so we could craft the conclusion if we wanted or in the discussion, that it should be within that range of arachidonic acid.

So, I guess my question, that's longwinded, Don, in your team not having the fatty acid composition, what was your concern?

DR. BELSITO: Well, I think that we grappled with that too since we had gone out -- since we are on record saying that the data for arachidonic acid are insufficient and yet here we have rice germ oil that we've already approved containing 5 percent arachidonic acid. However, a particular ingredient is used only at 1 percent in cosmetic products, so you're looking at 1 percent of 5 percent, and then you're looking at whether, in fact -- how much free arachidonic acid will be broken down from these fatty esters. So we felt that that was low.

I think if we have, you know, concentration information, which I don't think we have on the ones where we're missing data, that would be helpful. But you have ingredients like shea butter that are used up to 96 percent, so our concentration range that we're going out in the present practices reviews is theoretically up to 100 percent. And if we don't know the arachidonic acid concentration, we could be saying it's okay to use a product up to -- with 8 percent potential arachidonic acid. So, that was our level of discomfort in not knowing concentration of use for these particular vegetable derived fatty acids and knowing the amino acid composition.

DR. SLAGA: You're referring to free arachidonic acid, right?

DR. BELSITO: Well, we don't know how much they'll be broken down, but, yeah, I mean, when we -- the arachidonic acid report was specifically looking at arachidonic acid and we were unable to reach a safe as used conclusion. So, you know, I think that we can finesse the fact that we've approved rice bran germ oil and we can, you know, finesse the 8 percent in the Spyro-whatever, but I find it hard to finesse when we don't know what the concentration of use is going to be for these plant-derived oils and we don't know what the arachidonic acid --

DR. SLAGA: What level of arachidonic acid would you be uncomfortable with?

DR. BELSITO: We never reached that, that's the problem, otherwise it would have been a safe in used up to conclusion.

DR. BERGFELD: Dan?

DR. LIEBLER: One point that I'd like to raise is that as you look at the fatty acid composition tables for all of these oils, one of the things that struck me is how unusual arachidonate is in the plant oils and, you know, with that many analyses, you begin to wonder about the possibility of false positive results. And it may be that indeed rice does produce arachidonate incorporated into, you know, glyceride, esters, and so forth, and it also may be that that measurement, that determination is incorrect, and I would like to see, if possible, whether or not there are any additional analyses available on rice oils because it looks like such an outlier.

Now, it might be biologically true, but it looks like such an outlier that it may be incorrect and it may essentially, you know, obviate this entire discussion.

DR. BERGFELD: Jim?

DR. MARKS: I hear the Belsito team's rationale and I am willing to withdraw the move that I made earlier that we have a tentative report with all of them safe, and amend that to say, all of them safe with the exception of the ten oils you mentioned and the insufficient need is the fatty acid composition.

DR. SLAGA: Are we asking them for a reevaluation of the rice?

DR. BERGFELD: Don?

DR. BELSITO: There's a -- we were told yesterday there's a book that's been published by FDA that we haven't been able to get our hands on that may well provide all of the information we need, and also it was recommended that we double-check against that book the reported arachidonic acid concentrations in the rice bran oil and the Spyro-whatever.

DR. BERGFELD: Any other comment?

DR. MARKS: Well, I think despite the level -- if the level of arachidonic acid is truly what is published in rice, we still came to a conclusion in spite of that that the -- that rice was safe with all the biologic endpoints. So I'm -- I heard you earlier say, Don, about somewhere around 5 percent we can finesse it. I think for rice it's fine. I think it's the other oils that if we don't have all the data we've got to say it's similar to rice so we feel it's safe.

DR. BERGFELD: Did you also include in the discussion from one side or the other use -- concentrations of use that you wanted to know?

DR. BELSITO: Right. Yeah, well, I mean, if we don't get --

DR. BERGFELD: Fatty acid.

DR. BELSITO: -- fatty acid composition, then we -- I mean, if they tell us it's being used at 0.5 percent, we may be less concerned because obviously it's not going to be 100 percent arachidonic acid. In fact, it will probably, at least based upon all the information we see, be negative or negligible.

DR. BERGFELD: So, your request really is for composition and concentrations of use?

DR. BELSITO: That would help.

DR. BERGFELD: Yeah. And that is your motion?

DR. MARKS: So, the motion was that we move forward to issue a tentative report, that 234 of these oils are safe and the other 10 we need the fatty acid composition --

DR. BELSITO: Or concentration of use.

DR. MARKS: Or concentration of use, yes.

DR. BERGFELD: Is there a second?

DR. BELSITO: Second.

DR. BERGFELD: Any further discussion? Seeing none, I'll call the question. All those in favor of safe? Thank you. Unanimous.

Then moving on to the last group -- or last item in this particular grouping, Disperse Blue. Dr. Belsito?

DR. BELSITO: So, I'm missing my notes here, but anyway, we decided to go ahead and begin opening this report to look at new data, including IARC data, and also because of concerns that this material is no longer permitted in Europe, and so a full document has been prepared. And with the help of many people, including most recently Ivan Boyer, risk assessments were prepared under various scenarios. And regarding that, it appears that our original conclusion that these could -- this material could be safely used up to 1 percent to print it. The main printer at the Council sometimes will go down, which normally captures color. But if we go to a different printer --

DR. LIEBLER: But if it was printed to a.pdf, the color should come through.

MS. FIUME: Unless we run out of color ink. Yeah, it should have at least --

DR. LIEBLER: It should have come through. It's all in the computer.

MS. FIUME: I don't know because some are and some aren't, and they're generally scanned the same way so I don't know what happened.

DR. LIEBLER: It wasn't editable on the.pdf, so I think it was scanned in.

DR. BELSITO: So moving on to the next super group, Edible Oils, and I guess --

MS. FIUME: I did have two corrections on the composition that I did not capture that are now marked by hand. These aren't updated on data profile for -- as of Thursday afternoon are captured on here.

DR. BELSITO: Great. Okay. I guess the

first order of business -- and Carol had raised this as the title of this report -- are all of these oils truly edible?

DR. EISENMANN: Especially I think besides oils with high Oryza acid. The FDA limits food use of Grape seed oil if it contains less than 2 percent. And even Rapeseed oil with less than 2 percent Oryza acid is not permitted for use in infant formulas.

DR. BELSITO: Right. So I guess the title of the report I would recommend would just be "Plant-derived oils and their derivatives as used in cosmetic products." Is everyone happy with that?

DR. LIEBLER: So are there any derivatives that aren't the oils? In other words is "and derivatives" redundant?

DR. BELSITO: Well, there --

MS. FIUME: They're hydrogenated.

DR. BELSITO: Right, but they're --

MS. FIUME: They're soft.

DR. LIEBLER: They're still oils, I

mean, even it they're hydrogenated.

DR. EISENMANN: You have fatty acids in there and also unsaponifiables.

DR. LIEBLER: So I guess the question is does the oils, does the term "oils," encompass all that stuff already? That's what I'm wondering.

DR. BELSITO: Well, but -- I like it because it implies that it's not just the pressed processed oil from a plant, that there are things other than the pure oil. So I titled it just to say "plant-derived oils," I would think that that's all that you're dealing with.

DR. LIEBLER: Okay.

DR. BELSITO: Okay, so we're getting rid of "edible," which is good. And then we have this large group of oils to look at. And then what Monice has supplied is sort of a read across here in terms of what we previously reviewed and more importantly those that we have the fatty acid composition for. And basically we're going for safety based upon knowing what the fatty acid composition of these was. So the issue is where

we don't have it, are we going "insufficient" with these or in some cases we have like -- well, I guess we have it for all of those -- but we'll have it for the oil, but not for hydrogenated or salts, and I think we can probably include those. So we need to look at that, but the other issue is -- I want to go to that Table -- is that a couple of these have arachidonic acid, which we reviewed back in the '90s and the data for that were insufficient. And interestingly, one that has arachidonic acid we now say is "safe as used" and that's one of the rice ingredients. So it creates a little bit of a dilemma here as to where we're going.

DR. SNYDER: What about Ron? Wasn't it Ron who argued that these are not as a free acid, but a part of --

DR. LIEBLER: I think that's the key point. I'd noticed that one when I was looking over the discussion from the last meeting. Tom Slaga actually mentioned that these acids, the acids that we're talking about here in this case,

arachidonic acid, are actually part of a triglyceride. They're all esterified. I don't know that we know whether any of these have free arachidonic acid, but they're all esterified in triglycerides. It's possible that a small amount of the triglycerides would be de- esterified in the skin if there was any dermal penetration. I don't think we know enough to know what fraction of the applied dose would be de-esterified, and there are multiple positions on these triglycerides. I know that lipases display selectivity for doing that, the esterification reaction, but I would expect that the fraction that would be de-esterified would be relatively low. So we would probably be talking about an unknown, but probably very low, amount of any of the fatty acids being released from the triglycerides in the skin. And there may be a literature on triglyceride metabolism, which would be by lipases, not the phospholipases because they won't act on these compounds, but triglyceride-type lipases in the skin. There may

be some literature on it. I don't know if there is any. But what this -- the practical implication of this is even for an oil that contains arachidonic acid, it looks at 5 percent -- There are actually two oils in our report that contain arachidonic acid in the Table. The rice oil and the --

DR. BELSITO: Sclerocarya.

DR. LIEBLER: Sclerocarya, right, which was about percent listed. Those are the only ones. And if they release a small fraction of the arachidonic acid in the skin by lipase activity, I think that would realistically be a very small amount. And for that reason, any concern I would have would be considerably reduced because I think the issue with the arachidonic acid report was that was a report on the free acid, and there was insufficient data on the free acid issues in cosmetics products?

DR. BELSITO: It had to do with metabolic effects in the skin and the potential to increase, I think, risks of --

DR. KLAASSEN: Proliferation.

DR. BELSITO: Proliferation, cancers.

DR. LIEBLER: Right.

DR. BELSITO: And we never got that data.

DR. LIEBLER: So I think it's actually not as big an issue as we thought it might be in our discussion previously, at least from a chemical and metabolic perspective. I would expect it to be minor.

DR. BELSITO: I think that we're going to have to be very clear in a discussion as to why we think that because otherwise we look very foolish coming out and saying these are safe and they have arachidonic acid, and we've said arachidonic acid previously was insufficient.

DR. LIEBLER: Right. No, I agree, and so I think what we really need to do is to look and see what we can find in the literature on lipase activity in the skin.

DR. BERGFELD: On hair-bearing surfaces there's a lot of lipases in there.

DR. LIEBLER: Right. I'm sure they're there, and the real question, I guess, is how much arachidonic would be released from a typical applied dose of a rice oil- containing product.

DR. BELSITO: Well, I guess one way of doing that is we have Oryza sativa Rice Germ oil. It has about 5.48 percent. We can go back to the rice report and see what kind of information we have on dermal effects of the germ oil, whether in fact it's there.

MS. FIUME: When you say dermal irritation, sensitization, do you mean --

DR. BELSITO: Anything dermal whether it would help us further argue that the small amounts of arachidonic acid in these two plant oils are not issues because specifically we're already signed off on germ oil. So it would be nice to know what data we signed off on.

DR. BERGFELD: So are you wanting to do that today because the books are in the --

DR. BELSITO: Well, I mean, this is still Pink. I think, I mean, we can still go

forward and always reassess the data. I don't think it's something that we can do today. That rice report was huge. But we can just look at what information we had in the report on the germ oil because I remember -- I mean, if you remember, that report was years in the making and we're looking for data on all the individual ingredients and compositions of the husk and the whatever.

MS. FIUME: Dr. Belsito, on page 8, it summarizes the data from that report that was specifically rice bran and/or rice germ to the animal.

DR. BELSITO: Okay. So it looks like we had irritation sensitization, phototoxicity, and photosensitization.

MS. FIUME: On those specific ingredients?

DR. BELSITO: Right. On those ingredients.

MS. FIUME: And then in Table 7, which is Panel Book 95, this is a very brief summary of saying it was found clinically for Rice Bran oil.

DR. BELSITO: Well, why don't we mull that over and look at the new Table that Monice has handed out and look at the ones that we don't have any fatty acid composition and decide where we want to go with those.

DR. SNYDER: Is it still 23 that we don't have or did we reduce it with this Table? Do we know?

DR. LIEBLER: It's been reduced quite a bit.

DR. SNYDER: It went from 46 to -- they cut it in half, but I don't know. This new data refines it even further? I see we've added some in there by hand it looks like.

MS. FIUME: Those were -- I believe they were already there.

DR. SNYDER: Okay.

DR. LIEBLER: If you go by families, which are in the hard copy that we have, if there's an "X" in the fourth column from the left for each colored group, either white or colored group, then I consider that evidence that we have

data on the content for that family. And the only one that I think we have missing is on the last page, page 4 of the Table, which is the Schinziophyton. It's probably about a third of the way down. It's a blue color -- Schinziophyton Rautanenii kernel oil. And I think that's in four loco, isn't it? Just kidding.

DR. BELSITO: Well, we also on a different species of Grapefruit seed oil, Citrus Paradisi, as opposed to Citrus Grandis. We don't know fatty acid composition. And then Coix Lacryma-Jobi, Job's Tears seed oil.

DR. LIEBLER: On page 3, Orbignya Speciosa kernel oil. Page 3.

DR. BELSITO: And then a couple of different cultivars of Strawberry Fragaria. We have that stuff, but we don't have Chiloensis, the Vesca, and the Virginiana. The question is are they going to significantly differ? And then Lycium Barbarum seed oil, Morinda Citrifolia.

DR. EISENMANN: Monice, have you had an opportunity to look at that FDA book edited by

Daniel Firestone?

MS. FIUME: We're in the process of trying to get it.

DR. EISENMANN: It had a compilation of -- it's titled Physical and Chemical Characteristics of Oils, Fats, and Waxes. It was published in 2006. Somebody sent me one page of it and it goes through all kinds of sources and summarizes the data. It's available on the Internet and it looks like it has a fairly comprehensive number of oils in it. It might be another source for some of these.

DR. BERGFELD: I thought that the actual botanical ingredients to read across were very hard because of the source of the material varying so much in the plant. Don?

DR. BELSITO: I'm sorry, I was trying to finish --

DR. BERGFELD: I said to read across these oils are probably very hard because of the source of each part of the plant in which the oil is derived gives you a different composition. So

I'm not sure I can understand all these blue marks and the lack of data in the fatty acid, realizing the fatty acid composition is key, at least was determined to be key. If they are lacking information on fatty acid contact, we probably cannot deal with them. Is that correct?

DR. BELSITO: Well, um --

DR. BERGFELD: Because I don't think you can read across.

DR. BELSITO: No. Yeah, I mean, it -- I think that within a family, for instance, all the peanut ingredients, even though we don't have fatty acid composition on all of them as Dan said we can. The ones where we don't, I mean I think we'll have to go insufficient data. So that's why I wanted to look at this Table first and decide where are our needs. And looking at the first page, I think all of the groups are covered unless I'm missing something.

MS. FIUME: The Arctium Lappa seed? It's right under the peanut.

DR. BELSITO: Oh, yeah, thank you.

Arctium Lappa seed oil. Okay. So on the first page, we have that one. When we go into the second page, the issue is we don't have it for Citrus Paradisi, which is a different cultivar than Citrus Grandis for which we have it. This is a Grapefruit seed oil. So do we need it? Are we assuming Grapefruit is Grapefruit? I mean, I know that when we did other species, there were some significant differences. Was it Kava where there were differences in composition depending upon the -- or lavender?

DR. BRESLAWEC: There are differences and there's variability, depending where they're grown.

DR. BELSITO: Right.

DR. BRESLAWEC: There's a pretty broad range of variability.

DR. LIEBLER: I would say that we just don't know, and we don't have any basis for knowing. I could probably sit here and try and convince you that the cultivars of strawberries all make strawberries so the oils ought to be

pretty similar, but frankly I'd be making it up. I mean, either we have the data or we don't have the data.

DR. BELSITO: Okay. So then for Citrus Paradisi Grapefruit seed oil, that would be insufficient. But then -- and this may beg the question -- stuff that is labeled as Hydrogenated Grapefruit seed oil and Unsaponifiables, are we sure that comes from Citrus Grandis? Because if we're not, then that falls into the insufficient.

MS. FIUME: I will check the dictionary and see if it says that's where they're coming from.

DR. LIEBLER: I would suggest with the hydrogenated oils, it becomes less of a concern because you're taking out all the double bonds and hydrogenating these. So you're essentially making just a series of long chained fatty acids that are fully saturated. I think our main concerns about the fatty acids have to do with those that have either a large number of double bonds, i.e., arachidonic acid.

DR. KLAASSEN: I think that's kind of what it boils down to. I mean is there any fatty acid other than Aracadonic acid that we might be concerned about?

DR. LIEBLER: I don't think so.

DR. KLAASSEN: I don't think so either.

DR. LIEBLER: I mean, arachidonic is special in large because there are a lot of -- there are enzymes that metabolize it to highly bioactive products, and there are receptors for those highly bioactive products.

DR. KLAASSEN: Exactly.

DR. LIEBLER: So that's an activity arachidonic has over and above any other fatty acids that are highly oxidizable like Linolenic acid, for example.

DR. BELSITO: Okay. So then what Dan's suggesting is when it's hydrogenated, we really essentially don't care about it, and it can be moved into the discussion as to why we are less concerned about hydrogenated. Okay. So we are saying Citrus Paradisi, though, in the fatty acid.

Coix Lacryma-Jobi Job's Tears seed oil we need. The different cultivars of Strawberry Fragaria for which we don't have chemical composition. But the Chiloensis, the Vesca, and the Virginiana would be insufficient. Lycium Barbarum seed oil, Morinda Citrifolia seed oil, Orbygna Speciosa kernel oil -- this looks like schizophrenia -- Schinziophyton kernel oil. And then I guess the last question is, moving down to the V's, vegetable oil?

MS. FIUME: We received information saying what it can be a combination of, but the exact composition wasn't given. So that's why I left that open.

DR. LIEBLER: I thought I'd looked at that yesterday, and I noticed that on that list those were all ingredients for which we had fatty acid composition. So I think we can include vegetable oil. It's okay.

DR. BELSITO: Okay. So then we have one, two, three, four, five, six, seven, eight, nine, ten that should be going insufficient for lack of fatty acid composition.

DR. EISENMANN: So I have to clarify the memo. I wrote it, and I was trying to include ones that are highly used. And my understanding is they use the term vegetable oil for blends of oils. So I think it would be better rather than to refer to the memo to say you're okay with the blend as long as it's one of those with a composition known. Is there any other limitation?

DR. LIEBLER: Right.

DR. EISENMANN: Is that what I'm hearing?

DR. LIEBLER: Yeah.

DR. EISENMANN: I mean I don't want to limit to the list. I was just using those as an example of what the blend may contain.

DR. LIEBLER: So you're saying vegetable oil is sort of the scrapple of oils?

DR. EISENMANN: Well, no, no, it's -- some of -- I want a petrolatum-like material that's made of vegetable oil so we can put together a blend for that.

DR. BELSITO: Uh-huh, and that blend

could consist of any of these oils? Is that what you're saying? Or is it specific for what Monice told us it could be?

DR. EISENMANN: No, I'm saying it's specific for any of the oils. I don't know what -- I don't know if Dennis, you can -- I mean he's from Presperse.

MR. LABA: I think if the fatty acid composition is known, those would be the compounds that would be used for those blends. So I think you're on the right track with that.

DR. BRESLAWEC: Could you identify yourself, please?

MR. LABA: Dennis Laba with Presperse. We represent a company that does a number of oils.

DR. BELSITO: Okay.

DR. LIEBLER: So we can use the -- we can include the vegetable oils as long as they are composed of oils for which the fatty acid composition is known.

DR. BELSITO: Yeah.

DR. LIEBLER: Are you okay with that?

DR. BELSITO: Okay, so before we get back to the -- go ahead.

MS. FIUME: Before we go past, can I go back to two points just so I have it correct? First, Dr. Liebler, when you were talking about the lipase, did you say it was specifically to triglyceride in the skin?

DR. LIEBLER: Well --

MS. FIUME: Look for published literature?

DR. LIEBLER: Yeah, I would look for literature on triglyceride lipases. Most of the fatty acids in these oils are going to be in the form of triglycerides, mono-, di-, and triglycerides. So I would look for glycerol lipases, and I would exclude phospholipases because they operate on phospholipids and these are not -- none of these phospholipids.

MS. FIUME: And the second question is for -- so I know for the discussion -- the ten that are insufficient because of composition, should I leave it because the major concern is not

knowing the arachidonic acid component or just because it's insufficient because we don't know anything about it?

DR. BELSITO: We don't have the composition. We're not going to do Aracadonic acid. We'll get back to that at the end and how we're going to finesse that in the discussion.

MS. FIUME: So just lack of information?

DR. BELSITO: Lack of information as to what's in them.

DR. SNYDER: So can I go back to a little bit to what someone -- Wilma -- kind of mentioned? So the title of this -- would a better title for this be "plant-derived refined oils or derived from seeds?"

DR. BELSITO: Well, seeds are --

DR. SNYDER: Because aren't these all derived -- would that help us? I mean, if we more specifically refined --

DR. BELSITO: Well, seeds are parts of plants. I mean -- I would just say the plants --

DR. SNYDER: Where in here is it not

derived from a seed on the list?

MS. FIUME: I'd have to --

DR. SNYDER: That goes to Wilma's question about what constituent of the plant is actually what we are talking about for the oils. So are there some oils that are derived from non-seed?

DR. BRESLAWEC: Olive oil. And for Adansonia there's the Digitata oil and then there's the Digitata seed oil.

DR. SNYDER: But is that one in the same? It may just be a --

DR. BRESLAWEC: It's two separate and unique names.

DR. BELSITO: Yeah, but the more important one is olive oil, but it's not from the seed. It is from the seed?

DR. SNYDER: Because -- I mean, I think the refined is --

DR. EISENMANN: No, it's from the fruit. It depends on how --

DR. SNYDER: Well, the fruit or the

seed, yeah. I mean, I'm okay with that.

DR. LIEBLER: Fruit contains the seed, but it's from the fruit. You throw away the seed before you make the olive oil.

DR. SNYDER: I mean from seeds or fruit.

DR. BELSITO: I would just say "plant-derived oils." I think we're trying to --

DR. SNYDER: I mean, they are refined oils. They're not -- I mean they're --

DR. BERGFELD: We could put it in the discussion because it's majorly from the fruit or the seed. Because the leaves and the stem and the other composite parts from rice we know have totally different compositions.

DR. SNYDER: So we can more specifically define that in the -- under the Method of Manufacture or under the Source or something here, Processing.

DR. BELSITO: You have a comment?

MR. RE: Yeah. Tom Re from L'Oreal. Can't you define the class as "fatty acid oils?" It's closed to things like essential oils, which

are very different in composition.

DR. EISENMANN: Triglyceride oils or something.

DR. BELSITO: Okay, so then "plant-derived fatty oils."

DR. EISENMANN: Fatty acid oils.

DR. BELSITO: Fatty acid oils, okay.

DR. LIEBLER: "Plant-derived fatty acid oils and their derivatives."

DR. BELSITO: "As used in cosmetics." That's good.

DR. LIEBLER: And we did that without a fruit or a seed.

DR. SNYDER: But I think we need to capture that in the Processing about what the -- I mean, we're not talking about roots and leaves and all those other constituents. I mean, we need to capture some of that.

DR. BELSITO: Okay. So in the Processing, mention that basically most of these are coming from seeds, some of them from the fruit, but none of them from the plant, the root,

the stem, the husk.

DR. SNYDER: Other constituents of the plant.

DR. BELSITO: Okay, before we get back to the arachidonic acid issue, are there issues for this report?

DR. SNYDER: Glycidol. Glycidol content?

DR. BELSITO: Yeah, I thought that was handled somewhere in the discussion, that we expected them to be free of Glycidol.

DR. SNYDER: But we considered that an impurity, right? So I had on page 46 of the book, I mean we don't have a discussion except for at the end.

DR. BELSITO: Yeah we do, page 15, last paragraph, deals with Glycidol. "Panel considered safety of Glycidol and Glycidol fatty acids and refined vegetable oils."

DR. SNYDER: Okay, it mentions it there, but on the previous page it's mentioned as a possible constituent and that's basically stating

it as an impurity. So I was recommending --

DR. BELSITO: Possible impurities?

DR. SNYDER: Well, bringing all that impurity stuff together because we have the impurities-related Aflatoxin, the protein constituent for allergic reaction, so if we can bring that altogether in one impurity paragraph, it would succinctly deal with all the impurities except now it's spread over four paragraphs. So I've got a lot written here for that.

DR. BELSITO: Other?

DR. BERGFELD: I want to make another statement for clarity. I think that after you clean up the Summary as suggested, that when you come to the discussion, you have to declare what you're actually talking about, what group of oils you're actually talking about.

DR. SNYDER: We go straight into impurities so we need to cover that.

DR. BERGFELD: Fatty acid plant oils.

DR. SNYDER: So based upon the previous discussion, I would more thoroughly define what

we're evaluating here.

MS. FIUME: And before you go to arachidonic acid, I just want to be sure you're aware the next time you see it, I've created two new Tables that came in Wave 2 so the text on the dermal -- animal dermal irritation and ocular irritation -- will be out and just replaced like everything else with the Table.

DR. LIEBLER: Yeah, I looked at those Tables. They're very helpful.

DR. BELSITO: Okay. Anything else? So do you want to take a 10-minute break before we get to the arachidonic acid discussion on these? Good. Wilma, did you have something else on these?

DR. BERGFELD: Well, I was just going to say maybe we could deal with page 16 and make sure that whatever we've said that is on that list that that's complete. You said "the chemical composition specifically fatty acid profiles. Oils in which those data were not given in the report are needed." I don't want to go back and

check all those, but you just put in ten.

DR. BELSITO: Right.

DR. BERGFELD: So those should go in.

DR. BELSITO: Right. So that list would go away and the new list would just be the ten that we just --

DR. BRESLAWEC: Can I raise the possibility that between now and when you see the report next time --

DR. BELSITO: If you get the composition, yeah.

DR. KLAASSEN: Sure. That'd be great.

DR. BELSITO: It's the sense of the Panel that that's what's holding any of these ingredients up, so if we get a composition for one of the group, they're off that list.

Okay, so it's about 10:20, is that right? 10:18, be back at 10:30?

(Recess)

DR. BELSITO: Okay. We all back? So the last little bit that we need to figure out with these oils is how we're going to handle the

arachidonic acid content in the two that contain in, and particularly pressing is the fact, no pun intended, that we've already approved one of them as safe as used that now is said to be tainted.

DR. EISENMANN: You might also want to look at the mink oil report.

DR. BELSITO: The mink oil.

DR. EISENMANN: I don't know if there is any arachidonic in mink oil or not, but I've heard that animal oil is more likely to contain it than plants.

DR. BELSITO: Probably. Okay. So Carol's point was to check the mink oil report and see if -- though we probably didn't have information on the composition. So the --

DR. EISENMANN: I don't remember.

DR. BELSITO: -- the next step would be to check that report to see if we can get composition information from mink oil. And also we've been asked to speak up because we are being recorded, so make sure you keep your voices up when you want to be heard and low when you don't.

DR. LIEBLER: So I would like to raise the possibility that the measurement reported of arachidonic acid in rice oil, it looked like such an outlier that I think it would be worth trying to verify that. If there has only been one analysis of the fatty acid composition of rice oil in the history of mankind, than it's worth getting another one.

DR. EISENMANN: That compilation might be a good source for -- because, you know, the FDA worker who has compiled a bunch of --

DR. LIEBLER: It's such an outlier. It makes me wonder whether it's actually true, and if it isn't, then we're tying ourselves in knots over something that's a false positive measurement.

DR. BELSITO: Okay.

DR. SNYDER: Rice -- rice never dies.

DR. BELSITO: Right. Assuming it's not --

DR. LIEBLER: Not an outlier.

DR. BELSITO: -- not an outlier, then we still have to look at potentially dealing with the

sclerocarya birrea seed oil and any of these other oils that contain arachidonic acid.

So, Dan, your point was to look at lipase activity in the skin.

DR. LIEBLER: To see if there's any information on lipase activity, to see if that would help us interpret the likelihood of generating significant quantities of free arachidonic acid from these esterified forms.

DR. BELSITO: And Wilma says there will be high levels in the follicles. So if that, in fact, is borne out we would (inaudible).

DR. LIEBLER: So it's possible -- Wilma says high -- Wilma is not here, but Wilma says high levels of lipase activity in follicles. That doesn't necessarily mean there will be a high rate of desertification of arachidonic acid or any other fatty acids from these lipases.

My experience on this comes from work in our lab that was done on vitamin E esters in mouse skin, and when alpha-tocopheryl or vitamin E acetate or alpha-tocopheryl acetate is applied to

the mouse skin, we were interested in whether or not the acetate ester was hydrolyzed to yield the free tocopheryl, which is the antioxidant form. And we were able to document enzymatic hydrolysis, but it was a very small fraction of the applied dose. It was like less than a percent. I could look up the original work.

We actually did assays for substrates of esterases and were able to document enzymatic activity, and, although it was true that there is activity there, the amount of conversion of the applied material was vanishingly small.

So I realize that does not necessarily apply to the triglycerides or mono and diglycerides that contain arachidonic acid, but that example leads me to raise the question of whether or not -- even though there is detectable lipase activity, whether or not there is a significant amount of arachidonic released. And I suspect we won't find the data that will unambiguously answer the question, but I think it's important to keep in mind that even though

you do technically have these enzymatic activities, when you're applying relatively whooping doses of substrates, it's impossible to convert very much of the applied substrate to products.

I don't know if that actually really helps us deal with the question in our review, but at least it provides the perspective that I bring to this, which is that the amount that's released is likely to be very small.

DR. BELSITO: Well, I guess -- I'm just looking for -- why am I not seeing Oryza sativa in the frequency and concentrations of use.

MS. FIUME: It might be -- is that under the previously reviewed ingredients.

DR. BELSITO: Oh, maybe. Because the other argument is the sclerocarya birrea seed oil leave on and rinse off is 1 percent is what is listed as the concentration. So another argument would be here you're using it at 1 percent, and it has at most 8 percent arachidonic acid. And on top of it the panels believes that the amount of

release of free arachidonic acid would be low and that the amounts would be trivial and, therefore, not of concern.

Oryza -- what is that 5B release?

MS. FIUME: Yes. It's Panel Book 84. The germ oil is used at most at 3 percent, but the rice brand use up to 78 percent in them.

DR. BELSITO: But it's the germ oil that has it.

MS. FLUME: That has it. Okay. So that's used up to 3 percent.

DR. BELSITO: So, you know, that could be part of our argument that the concentration of use of these reported to have arachidonic acid is low to begin with.

DR. LIEBLER: I agree.

DR. BELSITO: So the germ oil is 3 percent you said?

MS. FLUME: Mm-hmm.

DR. BELSITO: And then the sclero is 1 percent. Anything else we can argue as to why we're not concerned about --

MS. FLUME: If the ingredients that you don't have fatty acid composition, if you know their concentration of use and it is low, then are they still -- should they still be placed on the insufficient list, if arachidonic acid is your only concern. Or because you don't have composition, they should just be (inaudible).

DR. BELSITO: Well, I mean, we already heard that the only fatty acid we'd be concerned about is arachidonic acid. We heard that from Dan and Curt.

DR. LIEBLER: I think it's two different issues. One is not having composition. In my view, that sort of violates our obligation to have diligence on these ingredients. Not evening knowing the composition in my view is unsatisfactory to begin with. So even if it's a small amount, it's still unknown.

DR. BELSITO: But we've had -- we have instances all the time where there is information lacking, and it's the view of the panel that they're too big. They wouldn't be absorbed and,

you know, the long chain alkyl groups just did that.

So if your real concern is we know these are going to be fatty acids, and if your only concern with a fatty acid would be arachidonic acid, and we're already making the argument that we're okay with the sclerocarya because it's low level, you know, we could say in the discussion that the panel noted the absence of the fatty acid composition for the following. However, current concentration of use is low, and the one fatty acid we would be concerned about, arachidonic acid, would -- you know, we've already made that argument.

DR. BRESLAWEC: Do we have concentrations of use on all the ones that are missing?

MS. FLUME: It would be bring the list down to six. We have it on four of that.

DR. BELSITO: Right.

MS. FLUME: We haven't looked at what they are.

DR. BELSITO: I mean, just, again, this is pink. We still have this book that was written that we need to consult. It may answer all of the questions we have. Certainly --

DR. BERGFELD: So are you going to go as insufficient right now, or what --

DR. BELSITO: Yeah. I mean, I would just do insufficient for all the ones we don't have chemical composition, and then we can always --

DR. KLAASSEN: See what happens.

DR. BELSITO: Yeah. We can always finesse it later. I mean, it's still pink.

DR. SNYDER: (Inaudible) finessed.

DR. BELSITO: Right. So basically the 10 without chemical composition, insufficient, the others, sufficient. It would be nice if the next time we see it -- I know normally discussions often times aren't made until -- does this go blue?

DR. BRESLAWEC: This will go blue.

DR. BELSITO: Okay. So there will be a

discussion. So the discussion on arachidonic acid, we'll see what the other panel says, but basically the two that have it, low use lipase concentration, unlikely to be significant conversion to free arachidonic acid to any significant extent.

DR. LIEBLER: I would -- since rice oil seems like it's more of a major ingredient, I would really like to see if we could verify whether or not that reported arachidonic acid measurement is correct or not, if we can get additional data on that. So even though we presumably have composition on the rice oils, I'm a little suspicious of it, and I'd like to see if there are other measurements that have been made.

DR. BELSITO: Well, I think that when and if we are able to get that book from FDA.

DR. EISENMANN: The FDA (inaudible).

MS. FLUME: We've contacted the author for the book --

DR. BELSITO: Okay.

MS. FLUME: -- and we're just waiting to

get it.

DR. BELSITO: So it's expected that we will get it. So, I mean, I would cross-reference even what we already have here to see that if it's in general agreement.

Anything else on the now non-edible fatty acid-containing oils? Okay.

DR. BERGFELD: I just have one technical question. So we have a bunch that are safe, and we have the insufficient list. So what we've got is a blue with partial safe and partial insufficient (inaudible).

DR. BELSITO: Right. And the general agreement, Wilma, was that if the writer gets information on the composition, the ones that we said were insufficient, we'll move over to sufficient.

~~Okay. CAPB. Okay. At the August meeting we finally issued a tentative report that the 31 ingredients are safe in cosmetics when formulated to be non-sensitizing based on quantitative risk assessment~~.

~~move to issue the -- I should say presumably the Belsito Team will move to issue a final amended report on these compounds as safe, and then I will bring up the potential editorial change in the conclusion, and that should engender a likely discussion, just as we've had now.~~

Next, should we do the edible oils before or after lunch? What time is it?

SPEAKER: It's only 11:15.

DR. MARKS: Oh, it's only 11:15. We definitely want to know that what we're eating for lunch is safe.

(Laughter)

DR. HILL: Let me just add on that last discussion. I'm sorry that I'm sort of grasping on how to interject this, that my impression was from the QRA that because it was actually building in a margin of safety and that sensitization was a proxy for any other biological activity for that amidoamine impurity that that was a comfort level in moving this forward associated with that, and, so, I mean, if you were using a different betaine

besides cocamidopropyl betaine, the sensitization studies would have to be there and then you will use a Q, R, and A that will build in an additional margin of safety beyond what's there. So, I'm not sure if you remove that language that you aren't removing sort of a layer of safety, a margin that's built in that. So, I'll just throw that out there between now and tomorrow because I'm not likely to say anything tomorrow.

DR. MARKS: Ron, I'm not quite sure what -- I think this is the read across. Is that what you're talking about? That the data we have now, if we do a quantitative risk assessment on some of these related betaines?

DR. HILL: I think to do the Q, R, and A, you still need some original sensitization data on the particular component if I'm understanding correctly. But with the Q, R, and A, you're also building in an additional margin on particularly that amidoamine.

DR. MARKS: Right.

MR. HILL: Because all of them are going

to have the DMAPA. But you're building in an additional margin of safety on the amidoamine by virtue of doing a Q, R, and A, which effectively removes any other concerns with biological activities of those impurities. So, based on that, I was comfortable moving forward. I'm not sure if you remove the Q, R, and A that you'd come to the same place. So, I'll have to think about that again between now and tomorrow, but I don't really plan on saying anything on that score tomorrow, but I'm just tossing that out there as a counterargument for removing it, even though I get the simplicity argument.

DR. MARKS: Okay. Ron Shank?

DR. SHANK: If you already have empirical human skin sensitization data, I don't see any need to do a QRA. We seem to keep losing sight of the fact that there have been 13 studies, human skin sensitization studies on formulation that are in the book, and every one of them is entirely negative. The only positive is when you have single ingredient studies, but on the

formulations, they've all been negative. If you have a formulization and you have negative human skin sensitization, why would you have to do a QRA?

DR. HILL: But my understanding of the reason of why those were negative is because, essentially, there was tight quality control on the ingredients that were used to generate the sensitization studies. They didn't use the lower grade material; they used prime grade stuff in order to do the sensitization studies. And, so, the point was if you source from a different vendor which happened to have a higher concentration of that amidoamine impurity or you're going off the map and you're not using cocamidopropyl betaine, then you might expect a different result, and that was my distillation, the impression I got from the Q, R, and A presentation last time.

DR. MARKS: Correct. I think that's exactly correct, which would be addressed by a RIPT on whatever that compound is or product is, I

should say.

DR. HILL: I mean, I guess I just need to ask myself the question between now and tomorrow is: Without the margin of safety that's billed in with the Q, R, and A, is there a margin of safety that is lost for any other potential biological activities of those amides because I still had that remaining concern.

DR. BAILEY: I would only add to that because I thought about that same issue, is the language in the discussion is really quite crisp and concise, and I think it captures it quite well there. So, as long as it's captured in the discussion, then I feel comfortable taking it out. Not so much because I think it should come out, but I think that the precedent of putting it in there and your point about having real RIPT needs to be encompassed within the language. So, I think by doing that, we met those requirements.

DR. HILL: Okay.

DR. SHANK: Here's one question on interpretation of a conclusion as it stands now.

For industry, will they have to do a QRA on ingredients and formulations for which they already have empirical data on human skin sensitization?

DR. HILL: Good point.

DR. SHANK: I don't think that's what we intend.

DR. HILL: Good point.

DR. SHANK: Yes.

DR. ANDERSEN: Well, that was what I intended when I wrote it. But now that you say it, it doesn't seem to make a whole heck of a lot of sense.

DR. MARKS: So, I'm going to bring up that editorial comment tomorrow, and then, Ron Shank, I think your reasoning is absolutely crisp and clear, and I don't need to speak for you in this case. So, I may ask you, Ron, to bring that forward.

DR. SHANK: What time does this come up? Is this going to be 8:00 in the morning?

DR. MARKS: Ron, if you feel

uncomfortable, I'll bring it up.

DR. SHANK: Thank you.

DR. MARKS: Yes, I will discuss it, and you can add on.

Any other comments about --

DR. ANDERSEN: 8:20.

DR. MARKS: So, I feel comfortable, Ron, talking about the sensitization issue on this. And as you recall, I'll probably close with this, is there was an attempt to try and quantitate how much of the impurities could be acceptable in the final product, and there was a great deal of difficulty trying to arrive at a conclusion concerning the quantification of the impurities.

Okay, next, the edible oils. And as you recall in the August meeting, we reviewed reports on edible vegetable and nut oils and decided to combine all of these into one report. And we wanted to have data on fatty acid profiles and we're at the point now where we have a combined report. We have some extra data here, and I guess the question is: Can we move on with a tentative

report of safe, and if we do that, which of these ingredients are we going to delete, if any?

And there was some concern when you look at the minutes on CIR Panel Book page 24. Let me see. Concerning arachidonic acid and then also how much arachidonic acid these might contain in the decahexanoic acid and the linoleic acids. And is that still a concern?

So, I'll open it up for discussion.

DR. SLAGA: I'd like to make a comment. The tables and everything, the way it's put together, we discussed that you did a great job of making a complicated topic much easier to review.

DR. MARKS: Just to put this in perspective, there are 244 at the latest count, I think. So, is this the largest number of ingredients we've seen grouped together?

DR. BAILEY: I sure hope so. (Laughter)

DR. SLAGA: I hope I don't see any more.

(Laughter)

DR. HILL: I think Alkyl PEG beats it, but I'm not sure.

DR. BAILEY: Yes.
DR. ANDERSEN: (Off Mike)
DR. MARKS: Which one was that, Ron?
DR. HILL: Alkyl PEG Ethers.
DR. MARKS: Oh, okay.
DR. ANDERSEN: But you can eat them.
DR. MARKS: So, moving forward, I get a lot of positives in terms of now the formatting of the tables. Are there any ingredients in here that we should not? Say there's, and we had a Wave 2 information to lots of data there, all the skin sensitization data, as expected, was fine from any irritation and sensitization point of view.
Ron, Ron, Tom, anything that you want to delete among this 244? Shall we make it 242?
DR. HILL: The individual composition files, I didn't crosscheck. They're not in the Wave 2. There were individual compositions that came in even after the Wave 2, correct? It was about, what 12, 17 more? They're not part of the Wave 2, right? There were individual files on the

Web Site.
MS. FIUME: Yes, in the table that was sent on Wave 2, that is updated to include anything that had come in by Wave 2.
DR. HILL: Right. But there were more, right?
MS. FIUME: There were a few more. It was things like olive acid, and the data profile that I just handed out, is complete as of Thursday afternoon, and we hadn't received any new composition information since then.
So, if you're looking at a quick list of what is and is not in there, column four is as much up to date as we have.
DR. MARKS: Monice, you're talking about the fatty acid composition in column four?
DR. HILL: Yes, sir.
MS. FIUME: Yes.
DR. HILL: But for the actual compositions, we have to look at the files.
MS. FIUME: The table is updated. The table that came in Wave 2.

DR. HILL: Oh.
MS. FIUME: Was updated with the composition.
DR. HILL: But those individual composition files that were like 17 are already rolled into --
MS. FIUME: Right. The only thing that would not then --
DR. HILL: It looked like to me there were some that I thought came in after the Wave 2 file was put together, but I wasn't sure.
MS. FIUME: Luffa. Let me find my original table.
DR. HILL: I guess I could go out to the Web Site and look at the file (inaudible) dates.
MS. FIUME: Luffa Cylindrica came in Thursday, I believe, of last week, Wednesday or Thursday. And then there were a few of the acids like olive acid. There were four acids that were added that were already part of the main ingredient that came in on Thursday.
DR. HILL: Okay.

MS. FIUME: They were rapeseed acid, sunflower seed acid, olive acid, and caryocar brasiliense fruit oil. Those specifications and composition came in on December 9. Otherwise, everything else should have been included in the table.
DR. HILL: Okay.
DR. ANDERSEN: And just going down the list, I was pleasantly surprised at the fact that we now have fatty acid composition data for most of the plant groups from which these oils are derived.
There are a couple of missing pieces, and if you follow through with the approach you've been taking, for oils where you don't have a fatty acid profile, I can't even pronounce most of these. Aleurites Moluccanus, bakoly seed oil on the first page of the new table that Monice handed out is blank all the way across. And you could easily say the data are insufficient for that oil. But everything else on page 1, all the families seem to have something. I did the same thing for

page 2 and the only hole I found was Coix Lacryma-Jobi seed oil. So, it's surprising that this trickle, well, a flood and then a trickle of data that have continued to come in have filled in most of the gaps. So, there really are only a handful of oils, I think, that are left for which you don't have that fatty acid profile.

DR. MARKS: Which one again on the second page so I can highlight that? I was trying --

DR. BAILEY: (Off Mike.)

DR. MARKS: Well, I'm looking at this file here.

SPEAKER: No, no --

SPEAKER: That's a Thursday.

DR. ANDERSEN: It's about one-third of the way down, Jim, on the second. Coix, C-o-i-x or Coix. And, again, just screening through, my impression is there's a handful. We ought to do Monice's more accurate accounting for which ones are left. But, procedurally, I don't see any glitch from how we approach things of saying that

okay, these are all oils, they're from plants.

You can argue whether they're all edible or not, but they're oils from plants, and, for the most part, they can be considered safe for use in the yadda, yadda, yadda, except for those where there are no fatty acid profile data and those would have to be insufficient, and that could be issued as a tentative conclusion. Industry would have one more shot at uncovering the fatty acid profile data for the remaining handful, and we can proceed at normal pace.

DR. MARKS: And, Alan, if you want to or Ron, Ron, or Tom, so, the logic in terms of being reassured with a fatty acid composition, what is the toxicologic effect that we're concerned about if we don't know? I know we talked about arachidonic acid, and then there were a couple of other fatty acids, but could you -- because that's going to have to be part of the discussion. Because we're using that as a cutoff as to determining insufficient data.

DR. HILL: I think the specific concern

that came up last time, and Dan Liebler raised it and I chimed in because I was sitting on it, was for fatty acids where there are known specific receptors, and that's why arachidonic acid was specifically raised, if those appear in the profile, then those could potentially have safety issues associated with them that would not be associated with other oils. And then you look at those in particular and see what particular safety information is available on them or is not available, decide whether they can be supported or not.

DR. MARKS: So, in some of these we have the fatty acid profile of say, for instance, arachidonic acid is present. Does it then become a margin of safety issue? So, if I go on page 28 of the book. No, not 28. Let me see. It's a read-across. Where we find arachidonic acid, maybe that's not a good one, but I look on 28, there's linoleic. I think Dan had brought that up, also, but I may remember incorrectly.

DR. HILL: Well, at first, he mentioned

ones that had double bonds were extensively unsaturated, and then I think he later qualified his remarks to say we might not need to be concerned with ones beyond where we know there's a specific biological target I guess is a better way to state it. I said receptor, but just specific biological target.

DR. MARKS: So, if I go on page 34, for an instance, arachidonic, if I look under Mangifera or Macadamia seed oil, there's 1.5 to 5, 1 to 7, 2 to 5 of arachidonic acid. I know I'm not looking at the right column. Sorry. But I guess what I'm saying is if arachidonic acid is present in any of these, do we eliminate it or we just say the concentration is so low it's not a problem?

DR. ANDERSEN: I think at the meeting last time there was a specific focus on the massive work that we had done X years ago on rice and the realization that the rice germ oil contains up to 5.48 percent arachidonic acid and the empirical data on rice germ oil showed none of

the concerns that had existed previously for arachidonic acid. So, arguably, that then becomes the cutoff point and maybe then for moving over on page 37, we've got Sclerocarya Birrea Seed Oil, whatever that heck that is, as 8.46 arachidonic. You could say well, we're not comfortable with that.

We have the baseline of rice and we're comfortable with that because we looked at it up, down, and sideways. This one is higher, and we have concerns about arachidonic. So, I could see that as an approach. For the most part, these things don't have arachidonic, but there's one that does. And you could say in a conclusion for those where you don't have full fatty acid profiles that arachidonic should be no more than was found in rice germ oil.

DR. BAILEY: In fact, during the discussion where you do itemize some of the concerns after the toxins and heavy metals and pesticide residues and so forth, you could put a short paragraph on there on arachidonic acids and

sort of capture the level that has been assessed.

DR. SHANK: There won't be any free fatty acids in these oils. I'm sorry. We keep going over this business about the fatty acids. These are oils, they are not fatty acids.

DR. HILL: But, however, our bodies can carve the fatty acids off of oils. I mean, we don't have any problem doing that biologically in our bodies. So, if we take it up by whatever route and it gets into the system, you can assume that those fatty acids become available to at least cell membranes.

DR. MARKS: Ron Shank?

DR. SLAGA: I believe these are basically edible plant oils, right? I mean, all of them. And I agree with Ron. They're not arachidonic acids or any other unsaturated. I mean, I seek out oils that have more unsaturated fatty acids. I mean, a lot of people do. I mean, so, what are we telling people? You can't put it on your skin?

DR. HILL: Well, in --

DR. SLAGA: In a percentage, it would be converted, and the skin would be a small level.

DR. HILL: I don't know if we know that. Do we know that? Dr. Bronaugh is not in here at the moment, but I don't know if we know that. On the other hand, I mean, certainly, we have plenty of arachidonic acid in our cells already.

DR. SLAGA: Yes.

DR. HILL: I mean, the question is: If you really bathe skin cells with an artificially high amount of this stuff from an exogenous source as triglyceride, would that cause any concern? And, I mean, I think that's the only thing, but with having studied the rice germ question whether going from five to eight would really matter --

DR. SLAGA: I doubt it.

DR. HILL: Because I wouldn't expect to be seeing something that had that sharp of a threshold. But if you went from 5 to 20, now, that might be --

DR. SHANK: I can't give you a reference, but I don't think there are significant

lipase activity in human skin.

DR. HILL: Yes, there is.

DR. SHANK: Can you document that?

DR. HILL: Dr. Bronaugh basically told us that there was, but he wasn't certain. Well, he gave us indirect evidence that, in fact, there probably is. And I asked that question, and I haven't had it answered yet one way or the other. I haven't seen a reference that said no, there is not or yes, there is, but there seem to be some indirect evidence suggestive that there very well might be.

SPEAKER: Yes.

DR. HILL: It'd be nice to know one way or another, wouldn't it?

DR. MARKS: Ron Shank, I want to circle back to your original statement in terms of these fatty acids because if I interpret it correctly, you weren't very concerned at all because these are edible oils, and, so, if that's the case, then why are we looking at a column that says "Fatty Acid Composition" and we are considering having

insufficient data when no fatty acid composition is included?

DR. HILL: But --

DR. MARKS: No, I'm talking to Ron Shank.

DR. HILL: I know you are. But I guess what I'm saying is when you eat something, fats are handled very differently than they might be in skin, and I'm not sure we totally know what happens in skin. I'm not concerned about any of these ingredients quite frankly, I'm not, but I'm just suggesting there's a gap in the science that it might be nice to have filled.

DR. MARKS: Ron, did I interpret what you said correctly?

DR. SHANK: You did. These triglycerides are triglycerides, and the fact that their component fatty acids are going to produce a problem in the skin I don't think is a real problem.

DR. BAILEY: (Off Mike.)

THE REPORTER: Microphone.

DR. MARKS: So, I think we can move forward if our team agrees that we can issue a tentative report that it sounds like we can say all these oils are safe and that we don't have any insufficient needs.

DR. SHANK: Have we determined that all of these are edible?

DR. SLAGA: That's an important question.

DR. SHANK: No? Because it's in the title now, isn't it? "Edible Plant Oils."

MS. FIUME: In the other team, they were discussing the same issue. Carol raised the point about the erucic acid content, and Dr. Re from L'Oreal actually came up with a suggestive title of plant-derived fatty acid oils and their derivatives. If you feel that that is more appropriate or not, I just wanted to throw that out there that that was suggested and the other team.

DR. MARKS: Yes, being a minimalist, I like plant-derived oil group. But Ron --

DR. HILL: I thought we settled on something like that last time.

DR. MARKS: Yes.

DR. HILL: I thought we had.

DR. SHANK: They said fatty acid oils as opposed to essential oils and things.

MS. FIUME: Yes.

DR. SHANK: Okay.

MS. FIUME: To make clear that it was not essential oils.

DR. SHANK: Okay.

DR. MARKS: So, that will obviously be a discussant point tomorrow. Ron, Ron, Tom, do you have feelings one way or another? It sounds like we're going to delete edible since we're not certain of that. And I guess if it's not edible, then it gets back to do we feel comfortable with this safety of it?

DR. HILL: I'll just say that I do.

DR. MARKS: So, what title do we want to go forward tomorrow or let me see who's -- I'm presenting it, so, do you want me to present

plant-derived oil group?

DR. BAILEY: (Off Mike.)

MS. FIUME: Plant-derived fatty acid oils and their derivatives, and it's to differentiate from the essential oils.

DR. SHANK: What derivatives are in here? They're just oils.

MS. FIUME: I think its referring to the hydrogenated, the salts, and things like that.

DR. SHANK: Oh, all right. I think I would take out the derivatives and just say plant-derived fatty acid oils.

DR. HILL: They're still derived from plants if they're hydrogenated, and why would there be salts? Salts would be only for the fatty acids, but here, they're oils, so, there shouldn't be any significant pre-fatty acid right?

DR. MARKS: Okay, so, tomorrow, I'm going to move that we issue a tentative report, that these ingredients are safe, and the title I'm going to propose is plant- derived fatty acid oils. And we have can have a discussion

concerning the derivatives if the other team feels strongly.

Any other comments? Rachel, do you have any?

MS. WEINTRAUB: I had one comment, but I think it's more based in my own lack of knowledge about the particular scientific issue. I was just thinking about oils in general and how they interact with sunlight, and there's not all that much photo toxicity data. I think there were only two studies. So, I was wondering, I assume since it hasn't been raised, it's not a concern?

DR. MARKS: Rachel, I'm not concerned other than the optical effect that an oil has when you put it on the skin. So, I think any oil has a physical optical effect. But it's not related to this here.

MS. WEINTRAUB: Okay, okay.

DR. MARKS: That it increases photo sensitivity per se.

DR. SLAGA: How hard would it be to find out how many are edible? I mean, just for our --

almost impossible, right?

DR. ANDERSEN: (Nodding)

DR. BAILEY: I think for most of them, we could find that out, but there may be a few that are a little more exotic and would be edible in certain limited settings, populations, yes.

DR. ANSELL: And then we'd have to define what we meant by "edible."

SPEAKER: Yes.

DR. ANSELL: Because in performance with the food chemicals codex or available in a super market or exactly what. I mean, we struggled with this in-house and felt that plant-derived or some language along those lines were probably a better --

DR. SLAGA: I'm not saying I have a concern versus edible or plant ones. I mean, I think the majority of these oils -- not free fatty acids; it's not going to be a problem.

MS. WEINTRAUB: One other question just about the title being linked to fatty acids, as you can see, we don't have fatty acid composition

information for all of the ingredients, all the oils here. So, is that important or not?

DR. MARKS: My take from a toxicologic and safety point of view, no. That's what I asked Ron earlier because we were considering do an insufficient data for a handful of these, which Alan had pointed out we don't have that, and then it got into the discussion, well, is this really necessary? We know these have fatty acids. Is the composition really going to make a significant difference when it's unknown to us at this point, and the conclusion was no. So, we can include these even though we don't have the composition. It's certainly nice to happen.

DR. SLAGA: (Off mike.)

DR. SHANK: Are you asking why do we say fatty acid oils?

MS. WEINTRAUB: I think I understand because you were making a distinction with the essential oils.

DR. SHANK: Yes.

MS. WEINTRAUB: Yes.

DR. SHANK: Which are chemically quite different and biologically quite different?

MS. WEINTRAUB: Yes. Okay. So, I did understand, I guess.

DR. MARKS: Any other comments? If not, then I will move tomorrow that we issue a tentative report that these ingredients are safe as used and that the title we're going to suggest is plant-derived fatty acid oils. Thanks, Monice, for giving us a little bit of an inside scoop on that.

~~Do we have time for the next one? The alkyl PEG ethers group.~~

~~(Pause)~~

~~DR. MARKS: Do we want to move on and consider this one before lunch?~~

~~SPEAKER: (Off Mike.)~~

~~DR. MARKS: Sure. Good. So, in the June meeting, the panel issued a tentative report that these 369, yes, Ron Hill, you're absolutely correct, (inaudible) are safe for use in cosmetic and the present practice of use in concentration~~

116th COSMETIC INGREDIENT REVIEW EXPERT PANEL

MEETING

BREAKOUT SESSION

Washington, D.C.

Monday, August 30, 2010

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Vanderbilt University School of Medicine

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Chemist

Other Attendees:

JULIE SKARE
Procter & Gamble

* * * * *

~~we certainly don't want to start getting into PC areas or non- cosmetic from a regulatory standpoint.~~

~~DR. BELSITO: Okie doke. Anything else on the isoparaffins~~? So we're ready to go back to vegetable oil at this point? Okay.

So this is Green 2 followed by Green 3. And I guess before we start I just want to point out that at least for one of the vegetable oils, mainly rice germ oil, there's a content of arachidonic acid. And as Wilbur and Monice know, but I don't think anyone else was on the panel when we looked at that, the conclusion for arachidonic acid was insufficient because of questions about dermal carcinogenicity. So we're going to have going forward, you know, with these -- the issue being out there that if they contain arachidonic acid, like rice germ oil is said to contain 5 percent. And then there's an ingredient that we previously found not to be -- not to have adequate data.

And then in the nut oil report, I'll

just jump to that, if you scan the tables there, arachidonic acid isn't even listed as one of the fatty acids that could be in nut oils. And I don't know if that's just an oversight or it's just not there.

Having said that, except for the arachidonic acid issue I thought that these could be safe as used and basically go from there. But we also had the chance to see comments from the Personal Care Product Council on these and I guess that is nice, but it raises, I guess, the issue why they're getting a preview before the panel is getting a look.

MS. BURNETT: That was for the SLR. The comments were for the SLR. We have new comments on the document that we received last week. We've been including comments that we had for the previous drafts into these packets. So they saw -- you guys do not see the scientific literature review, but it goes out for public comment and that's what we received.

DR. SNYDER: So during the -- so the generation of the SLR during the public comment period is when the scientific advisory you think is -- that's when they're making their comments -- initial comments?

MS. BURNETT: Yes.

DR. SNYDER: And then they make subsequent comments after each draft of the document?

MS. BURNETT: Mm-hmm.

DR. BELSITO: So I guess I was never aware of this since it's never happened before. So the scientific -- so the first time we look at the book it's beyond the scientific literature review point?

MS. BURNETT: It's a draft.

DR. SNYDER: That's if you look at the flowchart.

DR. BELSITO: Right. Okay. But the scientific literature review has been made available to interested public members?

MS. BURNETT: Mm-hmm.

DR. BELSITO: Or just interested members of the Personal Care Product Council?

MS. BURNETT: No. It's made public.

DR. BELSITO: And how is it made public?

MS. BURNETT: Announcement goes out. The industry submits their interested parties. We have it on the website. And then that way anyone who has data can submit it.

DR. BELSITO: Okay.

MS. BURNETT: And by the time you see it usually data has been submitted.

DR. BELSITO: Okay. So I was never aware of it. I thought the first time we were seeing it was the scientific literature review.

MS. BURNETT: It's called a draft when you see it.

DR. BELSITO: Yeah. So it's a step after. Okay. So then that's fair.

MS. BURNETT: And we try to address whatever comments we can. There were a few repeat comments because we didn't know necessarily how to handle them and then we do want your input on some of them, so.

DR. BELSITO: So I guess the biggest issue I have, and again this is where a read across would be helpful, is do we have all of the information for the ingredients of all the many vegetable oils we're including here? And I know the answer to that is no.

MS. BURNETT: No. And we have data. You saw the second wave. Monice and I are still working on summarizing it.

DR. BELSITO: Yeah. I saw that's all the second wave. But I think the issue is going to be unless we go back and look at arachidonic acid and find that it's safe as used or go back at the Noone and DeFavo data and try and do some kind of risk assessment on concentration based upon those vegetable oils, like rice germ oil that contain arachidonic acid, then any vegetable oil where we don't have full ingredient listing or full knowledge of the composition where the chain lengths are going to be lower than arachidonic acid or any that will be insufficient, as will any that contain arachidonic acid, the ones that we

don't know are insufficient for composition and the ones that do are insufficient because arachidonic acid is insufficient. Because otherwise it seems irrational that the panel found arachidonic acid to not have sufficient data yet we're approving vegetable oils that contain it.

The others in my estimation are safe as used. And then, of course, we have the heavy metal boilerplate, the aflatoxin, the pesticide. We have those issues that go into the discussion. Those were the only comments I had.

Curt, Paul, Dan?

DR. LIEBLER: I --

DR. SNYDER: I didn't have anything additional.

DR. LIEBLER: I was not on the panel when arachidonic acid was reviewed, but I've studied, you know, fatty acids and liquid oxidation on mechanisms and toxicity related to their oxidation products for a long time and I know that -- I'm not surprised that arachidonic acid would have issues, particularly in relatively high concentrations because it has such high liability than to go autoxidation to a variety of products that would have toxic properties.

I would imagine -- I remember reading through this I was interested in -- I was just looking for the table on the fatty acid compositions which I don't have in front of me at the moment, but I was struck by the fact that most of the oils we're talking about here don't have high polyunsaturated fatty acid concentrations. They're relatively low. You would sorry about linoleic acid, arachidonic acid, docosahexaenoic acid, anything with a lot of double bonds based by one carbon each. And those are relatively infrequently found. And I think this problem would be relatively self-limiting because oils that are high in those products would tend to go bad quickly and have undesirable properties because the oxidation products have a lot of awful smells.

And so I didn't notice any of the oils, at least I know that you had a list. Did you, Christina, in here, a table? And I'm just not finding it here.

DR. SNYDER: Well, we did receive a whole bunch of data on the composition.

DR. BELSITO: Yeah. For vegetable oils.

DR. LIEBLER: And the nut oils.

DR. BELSITO: Yeah. We're in vegetable oils right now.

DR. LIEBLER: Okay.

DR. BELSITO: Yeah.

DR. LIEBLER: Oh, yeah. Table 3. Sorry. Table is a lengthy table, but had most of these. So most of these oils are actually restricted to, like linoleic acid is a polyunsaturated fatty acid with two double bonds. So I didn't see this as likely to be much of an issue. Rapeseed oil.

(Discussion off the record)

DR. LIEBLER: But I think almost all the oils, maybe all the oils we're looking at here did not contain significant amounts of any fatty acid with more than two double bonds. And those oils -- those fatty acids would be pretty stable to most conditions of storage or use. So there are a couple of oils. It's hard to read this table -- this version of the table. Sometimes the computer fails me. Yeah, most of these don't contain polyunsaturated with more than two double bonds, if at most a percent or so, and that's probably not going to be cause for concern.

I didn't have any comment beyond that. I just wanted to point that out.

DR. BELSITO: So other than arachidonic acid, are there any fatty acids looking at their molecular structure that would concern you?

DR. LIEBLER: Well, the ones that would have a high liability to oxidation to obnoxious, you know, potentially dangerous products would be arachidonic, docosahexaenoic, which is 22:6, linolenic, which is 18:3 and that's kind of borderline. And those are the only ones listed on the table here that would have much of a liability. Things that have two double bonds, like linoleic, which is a major constituent of

many of these, or docosadienoic, which is 22:2 or eicosadienoic, which is 22 double bonds, those are very slowly oxidizing in comparison to arachidonic and docosahexaenoic.

SPEAKER: Which are the three again?

DR. LIEBLER: So the three that have the greatest liability of oxidation are arachidonic, docosahexaenoic. So arachidonic is 20:4. Docosahexaenoic is 22:6. And I would throw linolenic in there. It's borderline. That's 18:3. But all the fatty acids with no double bonds or one double bond are going to be essentially resistant to oxidation under any normal conditions.

DR. BELSITO: Okay.

DR. LIEBLER: Again, I think this might be a somewhat self-limiting problem because the oils that would have high fatty acid -- high polyunsaturated fatty acid content generally aren't plant oils in the first place. And they would have sort of been weeded out of product use because they would have had undesirable qualities. They would have smelled bad from the beginning because it's very hard to --

DR. KLAASSEN: Rancid.

DR. LIEBLER: Yeah. Rancidity. That's what rancidity is, exactly, all those aldehyde fragments of the oxidized fatty acids.

DR. BELSITO: Yeah, so let me just read you the discussion from arachidonic acid. Dermal absorption data are lacking in this report and we thought that the data -- that data was necessary for a determination of safety. Based upon the results of dermal absorption we felt there may be additional data needs. Referred to the studies about UV light-induced cutaneous immunosuppression and immunomodulatory data might be requested. Also, dermal carcinogenicity, photocarcinogenicity, human irritation, sensitization, and photosensitization.

So basically we went insufficient for dermal absorption and then if absorbed, immunomodulatory data, carcinogenicity and photocarcinogenicity, and human irritation, sensitization, and photosensitization. Anyway, interestingly, Monice wrote this report. It was quite a contentious meeting. What year was that? Not because Monice wrote it, but --

MS. FIUME: I think it was published in '93.

DR. BELSITO: October '93.

DR. LIEBLER: There's been a lot of arachidonic acid biology falling under the bridge since then so maybe one of the other things with arachidonic particularly is it's a fatty acid precursor to numerous bioactive prostaglandins and other eicosanoids, some of which have been very clearly shown since then to be key drivers of skin carcinogenesis. So there would be a lot of reasons to have concern.

DR. BELSITO: Well, you said there's been a lot of data in the past 17 years --

DR. LIEBLER: Since the early '90s, yeah.

DR. BELSITO: Okay. So then the question is whether, I mean, because again I don't feel that we can logically rule on the safety of these if we don't have all the compositions. Or if we have the composition and it contains arachidonic acid, unless we first reopen the arachidonic acid report and decide whether the data that's occurred in the past 17 years is sufficient to support the safety of that, then it becomes a non-issue to this report.

So I guess I would say safe as used assuming we have all the components and there's no arachidonic acid. Rice germ oil is insufficient because it's reported to contain arachidonic acid. And or the other alternative would be to table this and reopen the arachidonic acid report.

DR. SNYDER: I have a question. So how come our insufficient reports don't arise to the top of our priority list periodically? Or do we have any? Because that --

DR. BELSITO: It's surprising because if it was reported in '93, that's more than 15 years.

DR. SNYDER: Correct. So why isn't -- why isn't it a CIR report safety assessment?

DR. BELSITO: Why hasn't it come up for review?

DR. SNYDER: It went insufficient that long ago, not (unintelligible).

DR. BRESLAWEC: I think the assumption is that if there were data available, that industry would have provided them and we would have considered the new data and reopened the report based on the new data. But as a routine we do not look at --

DR. BELSITO: Well, there were two ingredients when I came on that were highly contentious. This was one. The other was urocanic acid for many of the same issues. So I suspect perhaps the reason it hasn't come back up is it sounds like form Dan that there is a lot of new data, but industry probably just stopped using it in cosmetics because of the brouhaha that went around. But now we're confronted with the fact that there are things like vegetable oils that at least partially may be composed of this fatty acid.

DR. ANSELL: Well, I think John -- John will be reporting tomorrow that the industry, through the Scientific Scholar Committee, has taken this whole insufficient issue on. We conducted an extensive analysis of all of the insufficient and are proposing some changes to the CIR procedures which would clarify the whole situation. We agree that this hanging out in this vague netherworld of neither safe nor unsafe is inappropriate. We have some proposals that I'm sure John is going to talk about tomorrow.

DR. BELSITO: Okay. Well, so I guess we'll have this discussion tomorrow. I mean, other than for the arachidonic acid issue I have no issues with them. The report is rather extensive and complete.

DR. LIEBLER: Yeah. I agree with you, safe as used. And arachidonic acid should be a flag. You know, it just looks like -- just look at these fatty acid compositions. It seems like at least for the (unintelligible) that were selected here they -- nature tends to make C12 to C18 fatty acids with no more than two double bonds and usually just one or none. And that's the bulk of these oils.

I guess the only question that comes up is if you flag arachidonic acid, do we get ourselves into a situation where we have to have some minimum value and have some basis for coming up with a minimum content of arachidonic acid?

DR. BELSITO: Well, I mean, that's the issue. But we need to go back and look at arachidonic acid to do that.

DR. SNYDER: We don't have the data.

DR. BELSITO: Right. So we can't do it without reopening that report and tabling this pending a conclusion on arachidonic acid.

DR. LIEBLER: If you ever open arachidonic acid you'd have a lot of new data to go through I'm sure. So.

DR. SNYDER: It seems as though that only two paths forward are insufficient here because the arachidonic acid report was insufficient, or safe here, and then reopen the record on the acid.

DR. LIEBLER: You could say safe as used as long as they don't contain arachidonic acid and cite the previous report.

DR. BELSITO: But then how can we -- when you have -- again, rice germ oil is reported to have -- I believe, have 5 percent arachidonic acid. When you say arachidonic acid, the data are insufficient, we haven't even said for arachidonic acid he data are insufficient at a concentration above whatever --

DR. LIEBLER: It's just insufficient.

DR. BELSITO: Just insufficient.

DR. LIEBLER: Yeah, so you could simply say that except for oils that contain arachidonic acid data is insufficient. You can just throw that oil out.

DR. ANSELL: This is still very early in the report process. I think this is an important issue and perhaps we could take it back to the CSSC and get some advice as to how we might address the arachidonic acid. I'm just not aware

of what to do at this point. It's quite possible that the users are quite aware of it and control the concentration because of, you know, very practical issues.

DR. LIEBLER: Can I ask either Jay or Monice or somebody else here who might know, the data in Table 3, were they from sort of a variety of sources?

MS. BURNETT: Yes.

DR. LIEBLER: A variety of sources? So it wasn't like it'll be great if one lab just had all these samples and did them all on a common platform.

MS. BURNETT: No. Some came from --

DR. LIEBLER: And put lower limits on -- if something is listed as blank, does zero mean less than, you know, some amount? I guess if that's a hodgepodge of sources then it's going to be very difficult --

MS. BURNETT: For each -- I'm not sure I should say this. For each entry there's either one or two references.

DR. LIEBLER: I see.

MS. BURNETT: For each oil.

DR. ANSELL: But Carol, in her search, identified potential databases. Not on the tox side, but on the agriculture side.

MS. BURNETT: Right. Agriculture.

DR. ANSELL: And thinks that there's probably a lot more compositional data.

MS. BURNETT: We received some composition data from suppliers I think they were that I couldn't access, but a member could. So we were provided that data. Some of it came from books, textbooks, source books.

DR. SNYDER: So that goes to the table. So the blank spaces do mean zero.

MS. BURNETT: There's, yeah. Nothing entered, there's nothing there.

DR. LIEBLER: No reported venture (inaudible) means it's below the limited platform, right?

MS. BURNETT: I would find a published study that had done a chemical analysis maybe on

-- well, it's the other report, but hazelnut oil -- that gave very succinct, you know, 14.1, you know, percent. And it would be a whole plethora of, you know, the fatty acids. And then you'd go to a textbook and it would just give you a rounded range.

DR. LIEBLER: That's precise.

MS. BURNETT: So there will be variability within the table.

DR. LIEBLER: We don't need to beat it to death.

DR. BELSITO: Yeah. But just since we're on that table, you know, if it wasn't for the fact that I was a member of the panel or a new member as it was when we did arachidonic acid, I would have looked at the highlighting and assumed not only that we had reviewed it, but that we had reviewed it and it was safe as used. So I don't know how to do it in a black-and-white copy, but if there was some way in the future when we're putting these tables together where there are individual ingredients that we previously

reviewed, to do it in a different color or to do it -- I don't know how you do it. You know, italicize it and underline it.

DR. SNYDER: Put another column.

DR. BELSITO: And, you know, indicate that --

MS. BURNETT: We can separate it out.

DR. BELSITO: Right. That, you know, the data was insufficient. I just looked up myristic acid. That was safe as used.

DR. SNYDER: It was? Okay.

MS. FIUME: Table 2 gets you the conclusions.

DR. BELSITO: I understand. But, you know --

MS. FIUME: No, I know you mean for the table, but you said you looked up (unintelligible).

DR. BELSITO: Right.

MS. BURNETT: And we do have -- I mean, we have some color printing capabilities, but when it comes to producing the Panel Book we don't

always know if we're going to have color or not. So. And then when it goes to the Journal it's not going to have a color option.

DR. BELSITO: No, no, no. That's fine.

MS. BURNETT: Okay.

DR. BELSITO: Okay. I suppose you're right. Monice, Table 2.

MS. BURNETT: No, I mean, I know it doesn't crossover, but rather if you were --

DR. BELSITO: Right.

MS. BURNETT: -- interested rather than having to go through a compendium.

DR. BELSITO: Right. Okay. So we'll see what the other group wants to do and Jay will bring it back to the Scientific Committee and see what they want to do about arachidonic acid. Whether tomorrow we go ahead with an insufficient for those that contain it or those that we don't have all the ingredients. The rest are safe as used. Or whether we table it to await a decision as to whether to reopen arachidonic acid. And, I mean, we can do nut oils, but it's going to be the same issue with nut oils. Only with nut oils the aflatoxins come in with the vegetable oils, you know, so heavy metals, pesticides. Otherwise, safe as used as long as they don't have arachidonic acid, aflatoxins, heavy metals, and pesticides.

MS. BURNETT: Did you feel that the two reports could be combined into one data plan throughout?

DR. BELSITO: I don't care.

MS. BURNETT: You don't care?

DR. BELSITO: Do you know what I mean? It's a rather mega report so I guess to have two different reports -- I guess the only reason to do -- the strongest argument to do two reports are that with the nut oils we need to do the discussion about protein versus fatty acid. So from that regard I would want a separate report for nut oils.

MS. BURNETT: But there's already the same discussion in the vegetable oil.

DR. SNYDER: Yeah. We have the same for vegetable oil.

MS. BURNETT: Because there are vegetable oil and fruits that can cause --

DR. BELSITO: Avocado oil? Yeah. Okay. So, fine. I mean, what does the other group want to do? Make it one big mammoth --

MS. BURNETT: And one is only 30 ingredients; the other is 200-something, so.

DR. BELSITO: Oh, well, 230-something, might as well try and go for a record after we did -- what was our record before?

DR. ANSELL: 368.

DR. BELSITO: I mean, we have to do that in the discussion. You know, I'm fine with that if that's what they want to do. I think the longer discussion will occur as to what to do with arachidonic acid rather than combine the two reports.

Okay. Did anyone have anything to say on nut oil?

So, cocoamidopropyl betaine. Well, we got this wonderful presentation this morning.

116th COSMETIC INGREDIENT REVIEW EXPERT PANEL

MEETING

Washington, D.C.

Monday, August 30, 2010

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* * * * *

A F T E R N O O N S E S S I O N

(1:01 p.m.)

DR. MARKS: What time is it?

DR. BERGFELD: It's 1:01.

DR. MARKS: It's 1:01, so it's time to begin. Everybody get enough vegetable oil over lunch?

Okay, we're going to go to the next group of ingredients, the vegetable oils, which also include fruit oils, too, if I read this correctly as to the ingredients.

Is that correct, Christina?

MS. BURNETT: (off mic)

REPORTER: Microphone, please.

MS. BURNETT: Anything that can be expressed from something that you can eat, except for nuts, is in that report.

DR. MARKS: Okay. And then I guess one also -- the issue was raised -- we'll start with the vegetable and fruits, and then we'll move on to the second group of oils, the nut oils, in this Green Book, but one might consider combining all

the oils together.

Okay. So this is the first time we've seen -- I'm going to refer to it as the vegetable and fruit oils. And as always, the first question is, do we have all the data we need to consider these ingredients are safe for including in cosmetics or do we have data needs?

So, I'll ask my teammates, do they feel comfortable with the data we have in hand?

MS. BURNETT: As you are aware, you received a second wave, it was composed of 800 pages, not -- that data was not in the report. You have not seen it, and we have not -- we're still in the process of summarizing it, so --

DR. MARKS: Most of that, yeah. So, what Christina is clarifying is that we have over 800 pages of supplementary data that was sent to us electronically by a for now unnamed individual, and there was no summary of it either in this paper document nor preceding that. Most of that, as I recollect, was sensitization, irritation, but there were some other toxicologic papers mixed in.

So, thank you, Christina, for mentioning that. So, large -- not large -- huge group of oils. I didn't tally it up -- did you, Christina? -- what the number of oils in fruit and --

MS. BURNETT: I lost track --

DR. MARKS: -- vegetable.

MS. BURNETT: -- but it's around 200.

DR. MARKS: Two hundred. So, approximately 200 cosmetic ingredients.

DR. SLAGA: So, we could make one big -- so, yeah, just before the meeting we were talking, Ron and I, about the magnitude of this and that how many years people have been eating vegetable oils of all type and putting it on their skin for centuries and centuries. And it would be hard to believe that there would be some other potential contaminants in that type of thing that we really would have to worry about. And I'd start right in the beginning, recommend we should -- since the nut oils are very edible, too, and they're very similar, so combine it all together into one document.

DR. MARKS: The two Rons, do you want to just proceed and discuss this as all one document and include the nut oils, which are how many more ingredients? About 30, 40?

MS. BURNETT: (Shaking head)

DR. MARKS: Yeah, so what's another 30 or 40 when we're up to 200? Does that make sense from a, let me see, both an ingredient toxicologic point of view that we should put these all together?

DR. SHANK: Yes.

DR. MARKS: Is there any alerts that should separate out the nuts from the vegetables and the fruits?

David, don't laugh. Did you like the way I worded that?

MR. STEINBERG: Loved it.

DR. MARKS: Is there any scientific reason, let's -- that we should separate all these oils?

No. Okay, so I think the first business, then, is we think we should combine these two reports and proceed with considering them as one group: The edible oil group.

DR. SHANK: How about plant-derived oils?

DR. MARKS: Plant-derived oils. Sounds good.

DR. SHANK: Better than edible to me.

DR. SLAGA: (off mic)

DR. MARKS: Now, so I'm just going to start it off by saying when we look at the plant oil from hazelnuts, that if I'm correct, the panel in the past felt there was insufficient data and issued a report of insufficient data. And the needs were concentration of use, manufacture contaminants, irritants, and sensitization, UV absorption, a 28-day dermal tox, a reproductive and developmental tox, and genotox were all the eight needs for hazelnut seed oil.

I think probably many of those needs are present with this, or not, when we expand it to over to 200 oils? And if that's the case, how do we reconcile a previous report? Do we reopen it?

Is the seed -- I don't think the seed oil is different than the oils we're taking about here. That's on page 20 in the second report, but let me see what that -- so, if you look on page 20, that's Panel Book page 172, you'll see under hazel seed oil, insufficient data.

DR. ANDERSEN: Yeah, I think, Jim, that's one example of why we thought there was actually benefit to combining all of these together. There are bits and pieces to address those issues from other oils, and if we can do a read across from those, because while there are composition differences, those composition differences may not be toxicologically relevant, then we have a big picture that we can paint even though for hazelnut there are missing pieces.

So, that's what we were thinking would be the strategy for this, not that we have actually found data on hazelnut, but we may be able to use a read across approach to say that data on other vegetable oils are applicable across the board.

DR. MARKS: And Alan, then, would you leave hazelnut seed oil standalone or would you reopen that to include it in this? Because under Table 1, which is on the preceding page, 171, that's included under the nut oils under derivatives, so presumably everything in Table 1 would be included in this or else we'd have to carve out the oils that we previously had made a --

DR. ANDERSEN: I don't think there's any sense in carving it out. I think we bring it into this report and once we get to the end of this we would say that there is now an amended conclusion for hazelnut seed oil.

DR. MARKS: Okay. And the same, presumably if it's all safe, the same would be that we would just note that peanut oil was previously safe and it's included in this report as safe?

DR. ANDERSEN: Yeah.

DR. MARKS: Okay.

DR. ANDERSEN: Yeah, I think for the reader it's nice to have all of the same things in one place so that you know what the perspective was on this group of chemically similar ingredients being used in cosmetics.

DR. SHANK: In the new data submissions that were sent to us as electronic files, PDF files, one of the studies was done on the massage oil that was a mixture of several oils, including hazel seed oil, and it was not sensitizing, so we have data for hazelnut on sensitization.

DR. MARKS: So, we're going to combine these two as, I like that, plant oils. Data needs? Or we can just start with the manufacturing. These oils are squeezed out of their plant source. Is that enough for a method of manufacture?

DR. SHANK: Yes. Yes.

DR. MARKS: Because we aren't going to obviously have the method of manufacture for each one of them. I think it could be put in the report that these are manufactured along the same way. How about impurities? We can obviously cover some of the concerns with our boilerplates, like pesticides and heavy metals. I guess what I'm doing is going down the data needs. Maybe I should just say, Ron, Tom, and Ron, are there any striking data needs that we should have asked for from industry?

DR. SHANK: I had no data needs.

DR. SLAGA: I have none.

DR. MARKS: None.

DR. SLAGA: I do not either.

DR. HILL: I have two general questions. One is related to the bleaching. It says, the statement is made in here, "bleaching the neutralized oil with activated earth." The activated earth is not a bleach, is it? So, does that mean that there's a bleaching process carried out with, I don't know, hypochlorite or something? And then "activated earth" is used either simultaneously or subsequently to remove highly colored pigments?

Because I also had a similar question about what exactly the deodorization process

entails, and I realize that's all going to be proprietary, but can we get some generalities as to what's actually going on?

MS. BURNETT: I can probably get more information on that. I have this textbook that's this big and I only gave a purview from that, so I have as much more information as you'd like on those processes.

DR. HILL: Well, some generalities as to what's known about those processes.

MS. BURNETT: Okay.

DR. HILL: And then we have to talk about the glycidols issue, right?

DR. SHANK: Right.

DR. HILL: (off mic)

DR. MARKS: And then, Ron, what you were talking with the bleaching, is that a data need or just a clarification?

DR. HILL: It's a clarification, information need that ought to go in the report, I guess. Well, but, however, for me it's less a data need than an informational need.

DR. ANDERSEN: Well, it's a staff assignment to finish the homework.

DR. HILL: Yeah.

DR. MARKS: One of the -- and I'll ask the panel members how to reconcile this because I have difficulty, if I look at, for example, sunflower oil, there's certainly not an alert in the literature that this is a sensitizer. It's used up to 96 percent concentration, yet we have only an HRIPT of 2 percent confirming its safety. So I think this is going to cut across -- that's just the most extreme example, but it's going to cut across lots of these oils where, although I don't have an alert of sensitization from either my experience or the literature, I have difficulty reconciling our historic use of either local lymph node assays to predict which are sensitizers or HRIPT are maxed to confirm they aren't. So, I need some help in reconciling that before -- you know, I don't want to put an insufficient. You've got to come back with an HRIPT that says sunflower oil at 96 percent is safe, but, at the same time, I don't know quite how to deal with that.

Can you help me?

DR. SHANK: We have human sensitization on 40 percent sunflower seed.

DR. MARKS: Right.

DR. SHANK: Forty percent.

DR. MARKS: Okay.

DR. SHANK: It's as high as I can find.

DR. MARKS: That must be the supplemental. I was going back in the report.

Wilma?

DR. BERGFELD: I thought that within the document there was enough citation regarding when the protein from the plant was included in the oil that that's when the sensitization occurred. And if it was properly refined and the protein was not there, that these oils were not sensitizing. And they had cited several where the protein was the specific allergen.

DR. MARKS: I think that's relevant to Type I immediate type hypersensitivity reactions in which you're concerned, like, for example, peanuts, that an individual might be sensitive from a Type I reaction. But what I was referring to is a Type IV delayed type hypersensitivity reaction, and whether the protein is there or not is really, by and large, irrelevant.

I think, to me, one of the things that stuck out, again, with proper processing it wouldn't be an issue, but if you take cashews, as long as you take the nut of the cashew, you're fine. If it's contaminated with shell oil, the oil from the shell, then it can be a dramatic sensitizer.

So, presumably in the manufacturing of mango- derived -- or not mango, cashew -- mango's the same issue. You get rid of the -- if you get rid of the skin of the mango, you're not concerned. But if it weren't processed in the right way, manufactured, you could potentially contaminate the mango seed oil.

So, I am back to I don't know how to -- I'm not particularly concerned, but I don't have specific sensitization data, say, like sunflower.

DR. HILL: I didn't see any for sesame either. Did I just miss it?

DR. MARKS: Oh, I think there will be plenty in here you don't find a sensitization.

DR. EISENMANN: They recently reviewed sesame in 2009, so I think we might -- I don't know how much of the original data in that report is in here, details.

DR. ANDERSEN: So, I think, thinking strategically, Jim, what I would like to be able to do is to show that there are some data across the entire spectrum of use concentration and if we're missing any irritation sensitization data in the high 90 percent exposure category, then that could still pop up as a data need. But if we have another oil that's been tested at 100 percent, and many of them have been, and it's not irritating or sensitizing, then the opportunity for extrapolating those data exists. So, even though there would be a missing piece for safflower, we would be arguing that the oil is not going to be significantly different from those that were tested at 100 percent.

So, we would want to be painting that picture of which oil do we have what data for and at what level, so that at least for, as was discussed in the other team, but you guys sound like you're asking the same questions, that this becomes a table, not necessarily to go in the report, but one that you can look at, to see what data elements are available for which oil at what level. And if that picture looks like there's enough filled in, you can be comfortable. If there are gaps you're not comfortable with, you get to flag them.

DR. MARKS: Christina, you are the most familiar. Is what Alan saying correct, that we have some HRIPT with 100 percent, or at least sensitization data for 100 percent of an oil? Without me going back and looking at those -- I was just picking on her.

MS. BURNETT: Eighty-six percent.

DR. MARKS: Eighty-six. Well, that's close. That's fine.

MS. BURNETT: I think there's some that are, if not 100 percent, pretty high.

DR. MARKS: That sounds fine, and then just to be -- for full disclosure, Christina sent me an e-mail concerning the Chenopodium quinoa seed oil where that was found to be -- when you look at the HRIPT there was clearly irritant reactions. There was erythema produced by a sunscreen containing that. And again, I think that could pretty much be ignored because it was a combination product, not just the Chenopodium quinoa oil. I thought if there was alert we would then focus more on that, but using what you have presented, I think it's quite reasonable to cut across.

So, sounds like we -- let me see here. So, Dr. Belsito and I will both be presenting this, so unless Dr. Belsito moves to include the vegetable, fruit, and nut oils all as one report, I will move to make it one report and with a conclusion of safe.

Any further comments?

DR. BERGFELD: Are you going to put in your discussion some of these elements that have just been discussed especially the plant-derived, the crosstalk or read-across information and support of safety?

DR. MARKS: Sure.

DR. ANDERSEN: Also, the issues of preservatives, heavy metals, that we traditional include --

DR. MARKS: Pesticides.

DR. ANDERSEN: -- in -- I'm sorry, pesticides. You've seen one P, you've seen them all. Yes. And that would be, again, an admonition to the people who source this material to continue what we expect is a longstanding practice.

DR. HILL: And so what's the story with the glycidols?

DR. SHANK: That can be handled in the discussion. Glycidol fatty acids is a contaminant. They're precursors to carcinogens, but in the purification process they are not

present in these plant-derived oils. That can be handled in the discussion.

DR. ANDERSEN: But we would want to be, again, advising industry that care needs to be taken to ensure that they are eliminated as the oils are processed.

DR. BERGFELD: Was there any concern about the reclassification of the document from -- between the fatty acids to triglycerides?

DR. SHANK: (off mic)

DR. BERGFELD: Yeah. But there were some fatty acids in there, too, were there not?

DR. SHANK: Free fatty acids.

DR. BERGFELD: I think there were in all three, but associated.

DR. MARKS: My sense is they were predominantly a mixture of triglycerides, is that correct?

DR. HILL: Some of them have mono- and diglycerides, I think.

MS. BURNETT: I put in the citations for previously reviewed fatty acids so that you were aware --

DR. MARKS: Right.

MS. BURNETT: -- and you could base safety on what the previous conclusions were.

DR. ANDERSEN: But the generic title that you've come to of plant-derived oils says it all.

DR. MARKS: Correct.

DR. HILL: Does that make sure that we're not thinking about things like limonene when you just say oils? Dr. Bailey raised that specifically in his memo to make sure that -- and then I think those were removed before we ever saw it. But if we just say oils are we making sure that it's clear that we don't mean volatile oils?

MS. BURNETT: It's no volatile oils.

DR. SHANK: Triglycerides, not essential oils.

MS. BURNETT: No essential oils, all -- sorry, blanked.

DR. ANDERSEN: Yeah, I think, Ron, I'm comfortable with plant-derived oils in the title with a very early in the introduction explaining that some things are not included for good reason.

MS. BURNETT: And there are in the list hydrogenated oils and some salts, simple salts, if you're okay with those.

DR. ANDERSEN: I think for generic, short title, we're still okay with plant-derived oils. The reader will very quickly see that it includes some that are further processed in terms of hydrogenation.

DR. BERGFELD: Can I ask a question? In several of these documents there is a statement both in the text as well as in the summary that with -- in regards to the plant oil is dependent on the region its grown, individual cultivars -- I'm not sure what that is -- and plant genetics. And I have written in here "plant part," for instance, seed versus kernel versus shell versus stem versus -- what are cultivars?

DR. MARKS: Cultivars are actually different varieties of the same plant.

DR. BERGFELD: Okay. So the plant part --

DR. MARKS: Like mums have multiple -- they're -- if you take the lay term --

DR. BERGFELD: Species?

DR. MARKS: No, it's not exactly a -- it's all the same species, but there are different variations within that species. So if you look at a mum, for instance, I'll use the lay word, there are spider mums, there are pompom mums, there are daisy mums, and those would be all considered cultivars, if I understand the floral/botany portion of this. That's my understanding of a cultivar.

And I think the differences in essentially different parts of the oils, my -- I thought in here the oils were basically from the nuts or the seeds within these plants because we get back to -- if it's just any place, then you get into, do you take a whole mango and squeeze that down and get a fair amount of caranols and anacardic acid and such, which are highly sensitizing in humans. And the same with a mango,

if you included the shell -- not the mango, the cashew -- if you included the shell you would have the same issue. It's just the nut, not the shell.

DR. BERGFELD: Do you think that you need to state that? I mean, because here on page -- Panel Book 20, just in the summary portion, the sentence is, "The percentage of chemical constituents and nutritional content in individual oil types is dependent on the region where the oil plant is grown, individual cultivars, and plant genetics."

The chemical constituents is also whether it's a seed versus the shell, so that's why I said plant part. I'm not sure that's a correct term. But this appears in many places, not in this particular document, but in others.

DR. MARKS: Right.

DR. ANDERSEN: But, Wilma, I think you're right. If you added "plant part" to that sentence, it's still a true sentence.

DR. BERGFELD: Right.

DR. ANDERSEN: That contributes to variability and, yes, you want to constrain that variability in this report to the identified sources which are mostly seed, but not entirely. There is bran oil, there's -- I won't go through the whole list, but the admonition to not -- not to be, I guess for supplier -- I guess it's mostly targeted to supplier, in preparing these to not cross-contaminate with other parts of the plant.

DR. MARKS: Correct.

DR. ANDERSEN: Saying that there's a seed butter or a seed oil that's okay if you are not careful, you could screw up that expectation of safety.

DR. MARKS: Which I think could be handled in the discussion, also, like we mentioned earlier.

Any other comments? So, we are going to combine these two reports.

DR. ANDERSEN: Jim, can I interrupt?

DR. MARKS: Oh, sure.

DR. ANDERSEN: Do you have a good citation to an example of the shell contaminating an extract that we could include by way of example?

DR. MARKS: Sure.

DR. ANDERSEN: Thank you.

DR. MARKS: Remind me. I can send you an endemic of cashew shell oil dermatitis which occurred in Pennsylvania a couple decades ago because of contaminated cashew nuts by the shell oil with the chemical analysis of that material actually.

DR. ANDERSEN: Thank you.

DR. MARKS: It's in the Journal of American Academy of Dermatology, probably about 1983? I'll give you the pertinent information.

Okay, Christina, if you don't find that reference, let me know.

MS. BURNETT: I am aware that there are some, so I can probably find some on my own.

Editorial question for you. On Table 7 in the vegetable oils, it's not very long right now that you see, but because of the data that we have received it's growing. What would be the best way you would like that organized? Alphabetized? By concentration? Section off each different oil? I don't know how easy it is for you to read right now and it could get really cumbersome. It starts on Panel Book page --

DR. MARKS: Fifty-four?

MS. BURNETT: Fifty-four. Yes.

DR. MARKS: Right. Can you be creative like you did with the use and concentration?

MS. BURNETT: Right now it's loosely alphabetized, so if it is -- if a related oil -- like in Table 1, I have it alphabetized for the most part. And then with hydrogenated I have categories with the hydrogenated -- what the parent is before it's hydrogenated. And that's what I tried to do on this to kind of mimic it, but if it doesn't make sense that way I can do it here, an alphabetized list or however.

DR. HILL: Could that be handled with some sort of a cross index table, just simply -- and I don't know, maybe that would just make matters worse. But, I mean, you're right, finding

things is important and it will be worse when it's getting longer. And I struggled with that a number of times when I was trying to go back and forth.

MS. BURNETT: Cross index --

DR. HILL: Some means of -- I mean, it would just list all the ingredients and give a table line or something. I mean, I don't know, some quick way of finding things.

DR. BERGFELD: (off mic)

DR. HILL: Yeah, because, I mean, you're referencing things by species name in some cases and common name in other cases and it would be nice to be able to quickly find both. And I'm not talking about for the whole document, I'm just talking about in that table.

MS. BURNETT: For the purposes of the report I did not write up a description of each study.

DR. MARKS: Correct.

MS. BURNETT: The table stands alone and that's it.

DR. HILL: Well, just finding things in that, what you said, relatively lengthy table, I mean, maybe that's a nonissue, but it is when you combine them.

MS. BURNETT: We'll brainstorm something and try to figure something out.

DR. MARKS: Quite frankly, I kind of like Table 7 because you can scan this pretty quickly in terms of concentrations and you can get the results and then you give a reference if you want more detail. So, I --

MS. BURNETT: I do see 100 percent oil on here, the babao.

DR. MARKS: Yeah, I noticed that, too, now that I immediately go to the table, so that takes care of that issue, Alan. But I think it would be difficult, probably, to condense this even though it might take -- you know, it's going to take more pages because we have more studies, but at least here it is and you have lots of sensitization.

DR. ANDERSEN: Well, what about the other direction, which is signposts? I'm looking at page 46 and I've got four entries for olive -- six, seven -- it's seven or so entries in the olive category. If there was a subheading that said, okay, here's the olive stuff --

DR. MARKS: Right, I think that's appropriate.

DR. ANDERSEN: Some of it's the oil, fruit oil, some of it's hydrogenated, but within that group it's -- you can look and see what your options are.

DR. MARKS: I think --

DR. ANDERSEN: And the olive gave you that signpost.

DR. MARKS: Right. I think that's perfectly acceptable to try and reduce and just give the ranges in that.

DR. ANDERSEN: Okay, we'll see what we can do.

DR. MARKS: Any other comments before we complete this discussion?

So, again, I'll reiterate, tomorrow I'm going to move that we combine both of these oils into one report, the plant oils, and that our conclusion will be safe as used for cosmetic ingredients.

DR. BERGFELD: And that's inferring that you've already commented on the protein and the soy and the nut?

DR. MARKS: Oh, yeah. That's all in the discussion. Absolutely. Yeah, it's going to be a very robust discussion.

DR. HILL: When we're back on the table, to give an example of what I meant when I said cross-referencing, in some cases, like raspberry, that's not too far different in the alphabet from -- I might slaughter the Latin -- Rubus idaeus, right? But on something like cranberry seed, Vaccinium macrocarpon, is quite a bit different to be looking at "c" in one case versus "v" in the other. So if you had something like cranberry, see the Latin name, or the other way around, if you go with olive and raspberry.

DR. MARKS: I would suggest we use the

INCI name and alphabetize it like that and just put in parentheses the lay name.

DR. HILL: But I was just -- if the table gets a lot longer I was just thinking in terms of having some way to do a look up so that you -- because otherwise you end up scanning the whole doggone table to try to find something, which even during the review is cumbersome. And I like the table, I agree.

DR. ANDERSEN: It's a challenge on how to work those signposts, there's no question about it. The reality is that the Latin name, while it's a good way of standardizing all of this stuff, they do not trip off the tongue lightly. And if we're doing a signpost, maybe cranberry is the better signpost under which you find the Latin name, et cetera, et cetera.

So, we'll take a look at it and see what seems to make sense because the average consumer looking at this isn't going to be thinking from Linnaean descriptions. It's going to be, oh, I'm supposed to stay away from cranberry.

DR. MARKS: I don't know, I would ask John and Carol's input. Because to me it's -- if you look at it from a world point of view, the only commonality is going to be the INCI name, which is the botanical name, not the lay name. So for us, even between Boston and perhaps someplace else, there might be different common names for the same cosmetic ingredient.

At any rate, we'll let you figure that out and we'll see it in the next edition with a tentative report with a conclusion of safe.

Next we're on to the 2011 Priority List and that's in the Buff Book 1, Panel Book page 16, et cetera.

Any comments about that? And my understanding is we're going to include a hair dye ingredient also in this.

DR. BRESLAWEC: If I could just point out that the only difference -- there are some differences between the list as you saw it in June and this list, and the changes reflect your comments and comments that we've received from

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MEETING

Washington, D.C.

Tuesday, August 31, 2010

~~type in there, Alan, or intended use?~~

~~DR. ANDERSEN: No. I think that will be clear from the discussion that it's -- you have lots of options on how to modify either the concentration of the ingredient, the level of impurities, or product type.~~

~~DR. BERGFELD: So, it's my understanding on page -- CIR Panel Book, page 76, under Quantitative Risk Assessment, that will be greatly expanded with the examples as indicated or suggested by Dr. Belsito? Okay.~~

~~Any other discussion? I'm going to call for the vote, then.~~

~~All those for the approval of the first version with amendment indicate by raising your hand. Thank you, unanimous.~~

~~Wow, that was a good one.~~ Let's move on, then, to the next one, which is the plant oils. Dr. Belsito presenting.

DR. BELSITO: Yes. This is the first time that we're seeing this report, which is probably the largest report we've ever had to

review. And we received a whole lot of unpublished data, et cetera, et cetera.

In looking at this in general, my team felt that we could go safe as used with the usual plant boilerplates, with the exception that there is one component -- at least, of rice germ oil -- and that's arachidonic acid that we previously reviewed and found to be insufficient. Also, Dr. Liebler had some concerns not only about arachidonic acid, but dodeca-hexanoic acid and linolenic acid as having more than two double bonds that could be relatively unstable.

So, what we need would be to actually take a look at all of the vegetable oils in this report and for those in which we don't have composition, those would be insufficient awaiting composition. Those that contained arachidonic dodeca-hexanoic or linolenic acid would be insufficient for data on that.

Alternatively, if we wouldn't want to take that approach, my team suggested tabling this and reopening the arachidonic acid report, since it's been 16 years since we last looked at it and there's been 16 years' worth of data on it. And see, perhaps, we could find the cosmetic uses if there are any -- I don't know, John, that was one of the insufficients when you reviewed it. Is it still being used?

DR. BAILEY: Yes.

DR. BELSITO: So, maybe we want to table it and go back to arachidonic acid and reopen that and see what we're looking at.

DR. BAILEY: I mean, it's still being used, but the use frequency is quite low. So, it's not a real widely used material.

I think it would be very difficult to find someone to support the providing the safety data for it. But that's just sort of my best guess at this point.

DR. BELSITO: But there may be data out in the public literature since we looked at it in '93 that would support our data needs.

DR. BAILEY: There's a huge amount of data, yes.

DR. BERGFELD: Do you wish to discuss this? Marks' team?

DR. MARKS: Oh, yes. We had similar feelings that we would move toward safe. I think how handling at this point we felt we could actually move forward with a tentative report of safe, but we hear the insufficient data needs.

One of the discussion instances we felt that we would take this whole Green Book and combine the vegetable -- there's actually fruit oils in here along with nut oils -- and just make it one large document with over 200+ ingredients and call it Plant Oils. So we would suggest combining these two.

And then I think going forward, as you suggested, Don, with an insufficient clarifying -- it's interesting. If we do arachidonic acid, then that will come up in a priority list, obviously, on the re-reviews.

DR. BELSITO: But if --

DR. BERGFELD: I'm unclear what you want to do here.

DR. BELSITO: Well, I mean, I think that we were unclear as to where the panel would want to go, because if -- and I guess partly we're curious why arachidonic acid hasn't come up since it was last reviewed in '93 and the data were found to be insufficient. But I think in some ways if we look at this and we call these ingredients insufficient -- those that contain arachidonic acid -- and arachidonic acid comes up and we find that the available data in the literature then supports the safety of arachidonic acid as used in cosmetics, then we would have to go back and reopen this document to change our conclusion about all of the plant oils that contain arachidonic acid.

So, personally, I would be in favor of tabling this, reopening the arachidonic acid report, seeing where that goes, and then coming back to this report knowing that the biggest issue was those plant oils that contain, potentially, arachidonic acid.

DR. BERGFELD: Alan?

DR. ANDERSEN: Monice has some information. But the answer to the question of why hasn't arachidonic acid come up -- the panel made the policy decision early on for re-reviews that we were not going to initiate a re-review of an ingredient for which the data were insufficient. That was industry's problem. If they wanted to come forward with the data, knock your socks off. But we weren't going to do their job for them.

MS. FIUME: I just wanted to add, I did check the FDA frequency of use. It is only 14 uses. And then I just did a very quick search on Tox Net using arachidonic acid and dermal carcinogen; there's no new data for dermal carcinogenicity, which I believe was one of the reasons it went insufficient.

DR. SHANK: The arachidonic acid isn't in these oils as a free acid, it's part of a triglyceride. So why pick out arachidonic acid? Or are you concerned about peanut oil? I don't understand why you need to table this to find out about arachidonic acid as a free fatty acid, because these are triglycerides.

DR. LIEBLER: Arachidonic acid -- I'm -- I guess I'm not sure whether I should be surprised that there aren't any more dermal carcinogenicity data on arachidonic acid since the mid-'90s. But there's a tremendous amount of research that's been done on arachidonic acid and eicosanoid metabolites of arachidonic acid in modulating skin carcinogenesis. I mean, this has been a huge area of research, as Tom is quite aware. There's a lot of data. I'm not sure exactly where it comes down.

Admittedly, most of the arachidonic acid physiologically that's released is coming from phospholipids, released by phospholipases. These are on triglycerides. It's possible they could be released by lipases also in the skin, but I'm not sure about, you know, how efficient that process would be.

If I -- I just eyeballed the charts on the arachidonic composition of the oils in both of the reports, and it looks like the only one that has any reported arachidonic is the rice oil. And, you know, that's the only -- that's actually sort of an outlier among all of the oils in having a longer chain polyunsaturated fatty acid, because for the most part these are at most diunsaturated -- mostly monounsaturated, mostly shorter chain length, which I think removes most of the concerns I would have.

I pointed out yesterday in our discussion that part of the problem of lipid oxidation products is going to be somewhat self-limiting in that the oils that have a higher propensity to undergo oxidation are going to probably be unacceptable for use in these products anyway because of, you know, generating undesirable smells and things like that. So, I think the -- one possible approach to this could be to just consider everything but the rice oil. And with the concern there being the relatively high arachidonic content relative to all the other plant and nut oils that are being considered --

DR. BAILEY: I thought rice oil had already been reviewed and is, you know, safe based on an earlier review. So, you know, I'm just not sure that those dots connect, so.

DR. BERGFELD: Dr. Hill?

DR. HILL: Yeah, I was just going to point out that -- but I agree with only arachidonic acid. But if your concern is three or four bond unsaturated acids, then cherry kernel oil has a high percentage of eleostearic acid, borage oil has a high percent -- a relatively high percentage of -- oh, it's pretty small of gamma-linolenic. Black currant seed oil has a reasonable percentage of gamma-linolenic and stearidonic. Evening primrose oil has a pretty high concentration of gamma-linolenic and cranberry seed oil has a high concentration of 18-3 ethyl- linolenic, so.

DR. LIEBLER: Right, those points are well taken. I also noticed that.

I think the additional concern with arachidonic is that there's specific receptors for

many of the arachidonic metabolites that potentially amplify its biological effects.

Now, if rice oil has already been reviewed and is safe as used, it's something I didn't catch. And that may preempt this whole discussion.

DR. MARKS: John, I'm looking on page 172 of the Panel Book. And, you know, that's nut oil, so that wouldn't be rice, I'm sorry. I guess I need to do the -- I was --

DR. BELSITO: (Off mic)

DR. MARKS: Been approved, yes. That's page --

MS. BURNETT: Panel Book, page 27.

DR. MARKS: Twenty-seven, so it had been approved before.

MS. BURNETT: In 2006.

DR. BAILEY: These are edible oils, you know. Vegetable oils. So, I mean, they've been around a long time, we have a lot of experience with them. And, I mean, I think these are valid points. Maybe they should be addressed in the

part of the discussion and, you know, if there's concern about arachidonic acid specifically, that could be captured also in a part of a discussion. I'm just not sure it's really -- these are points to hold up the process.

DR. BELSITO: Well it's certainly -- for rice germ oil, a small percentage of the total composition. I guess the issue would then become what about the oils for which we do not have composition. If you're concerned about arachidonic acid, I mean, I don't know. I mean, it's potentially that specific oil might have a very high percentage of arachidonic acid and the absence of knowing the composition, I think we'd have to go insufficient on that basis.

DR. SLAGA: But keep in mind, it's (off mic) about there's no free acids in this that would have to be released. And the odds of that happening in the stratum corneum area are essentially zilch.

DR. BERGFELD: Dr. Hill?

DR. HILL: I was just going to say that

the fact that they're edible has nothing to do with it in this case, because the question is what happens in the skin. Because the processing of lipids in the gut is totally different than what happens in the skin.

Well, totally, that's not quite accurate. But quite different.

DR. BELSITO: Dan, do you want to comment?

DR. LIEBLER: Well, the only -- I think that I would want to see more data. I suppose -- well, I guess I would want to see more data on the arachidonic for plant oils, for which there wasn't a safe as used, and a high arachidonic content. I think that probably -- unless there are plant oils that we're considering, we don't have composition data for that -- that concern kind of goes away.

I would point out that actually, fatty acids don't need to be released from phospholipids or triglycerides to be toxic. In terms of oxidation products -- my colleagues Jason Morrow and Jack Roberts of Vanderbilt have done a lot of

work over the years demonstrating the formation of isoprostanes by non- enzymatic oxidation processes that result in products with significant activities, even when they're still connected to phospholipids and triglycerides.

But I think based on the data we have on the charts in front of us, the only component I would have had any concern about would have been the rice germ oil, and that's safe as used already. So, I think -- I feel like Emily Litella, right? "Never mind."

DR. MARKS: Right. Actually, there are a number of oils that have been felt to be safe with the exception of hazel seed oil, that's the only one when you look at this entire group. And that was an insufficient data.

DR. BRESLAWEC: But that was hazel seed oil. Wasn't that addressed subsequently?

REPORTER: Microphone, please.

MS. BURNETT: We have received HRIPT data on hazelnut oil. I'm not sure which species. Might be both, might be just one of them.

DR. MARKS: So that really has no relevance to this issue of the arachidonic acids. So, do you feel comfortable, Diane, at this point?

DR. BELSITO: But we don't have the composition of all the vegetable oils that we're reviewing in this document.

DR. MARKS: Well, we have, what, 250, approximately? Do you think we're going to get that? Or can we use crossover -- cross-reading when we say rice is safe. And that was the one that, Dan, you altered?

DR. BELSITO: But that had 5 percent. We don't know that some of them that are out there that we don't know composition for could have 85 percent arachidonic acid. We just -- if we -- I think if we don't know the composition, you know, and perhaps we can get this from Dr. Dan's -- I don't know if you already sourced that or not. But I think we really -- since arachidonic acid has not been found to be safe, then I think we need to know the composition of all the vegetable oils that we're going to say are safe. And if we don't have a composition, then the data would be insufficient for composition. Specifically, of arachidonic acid.

DR. MARKS: Or, another way to handle that, Don, would be to come to a conclusion, again, using a disqualifier that it doesn't contain -- if we want to quantify it -- arachidonic acid above a certain level or whatever. I don't know. That would be another -- rather than what I'm afraid is, we're going to go down 250, get a list, and we're only going to have a small number that has arachidonic acid levels in it. But I'm not sure that we haven't looked yet.

DR. BELSITO: I think if you do that, then you'd have to justify it with a QRA. And you'd have to go back and look at the dermal carcinogenicity studies that we looked at for arachidonic acid, and do some type of QRA. And I don't know, based on the literature, if that's doable. But then, if we're going to do that, we might as well open the arachidonic acid report before we do it. But I don't think you can say, you know, because we allowed wheat germ oil at 5 percent to go forward that everything else -- and where are we getting this 5 percent? Simply from -- or look at the data from rice germ oil, rather. Look at that data and see what kind of data did we specifically have on rice germ oil in that safety report. Or were we doing read-across on rice?

DR. BERGFELD: Alan?

DR. ANDERSEN: I -- it's interesting that all of the composition reports that were available when we reviewed the rice group -- only one study from '86 demonstrated any arachidonic as a component. There's '99, 2000, 2002, subsequent with no arachidonic acid identified in the composition.

So, it's -- the data that show -- and the 1986 report was at 5.48 percent arachidonic. So, it wasn't a huge composition issue, and it hasn't been repeated in subsequent analyses. I don't know, Christina, if we have additional data beyond that. But it's just -- it wasn't a significant issue and maybe even wasn't a real issue, which probably is why the panel didn't flag it when we did the rice.

DR. BERGFELD: Dan, please?

DR. LIEBLER: I just want to suggest that I think the minimal level of due diligence that this panel should apply is to known the compositions of the products that we're talking about here. And in the case of the oils, the main products are the oils that stearified in these triglycerides. So, I'm not comfortable even though we might suspect that plant oils are all going to be in the range of about C12-C18 with usually no more than two double bonds. I'm not comfortable as taking that as a given without knowing the composition of the other oils. So, I would suggest -- I would not be in favor of -- I would consider lack of composition to be insufficient from the get-go.

DR. BERGFELD: Dr. Hill?

DR. HILL: I was --

DR. BERGFELD: Are you agreeing?

DR. HILL: I was just agreeing with what

he just said.

DR. BERGFELD: Dr. Slaga?

MR. KLAASSEN: One of the problems with, you know, when you're talking about these natural products is the amount of certain oils that you have this year is different than next year. And this -- if it had more rain or less rain or more stress or less stress, you get different components. So it's a little different in that regard.

Now, another question I have is with our real problem here. I mean, what is known about -- Tom maybe has the best background in this. What's known about any fatty acid producing carcinogenesis in the skin? I mean, I can -- you -- there's many theoretical reasons why they might. I assume there have been a fair number of experiments and kind of what's the general knowledge?

DR. SLAGA: There's a lot of data (off mic) free form. But I know of no studies with (off mic) complex oil that has shown to be carcinogenic. It's always the free fatty acids, the unsaturated --

MR. KLAASSEN: (Off mic) triglyceride of any -- it's just not been done or they don't cause --

DR. SLAGA: No, no, there's -- it's a lot been used as vehicles. And the vehicles come out to be negative. It's -- tremendous literature on arachidonic acid, and some other related type of unsaturated fatty acids. But that they do have some type of activity -- not cancer-causing, they're more tumor promoting or enhancing activity.

DR. BERGFELD: Dr. Marks?

DR. MARKS: Dan, maybe you can give Christina some guidance in terms of this -- the composition of each one of these 250. Would you like that in some sort of tabular form where you could have ranges, almost like the use in concentration? Or do you want to see each oil with a composition under it? And if we don't have a composition, then I think the -- what you infer is that it would be an insufficient data.

DR. BELSITO: That's what we want, composition for each of the oils. And for those that don't have composition, they're insufficient pending data on the -- it could be complete composition of arachidonic acid.

DR. LIEBLER: I agree with that. I mean, I think that one of the things that you have to deal with when you decide you're going to take on 200 ingredients is that they all are -- you know, they all have compositions. And we're still responsible for them. The fact that it's a logistical nightmare is really -- doesn't change that fact. We need to know the composition of these ingredients.

So, ultimately there would have to be a table. A huge mega table of some sort that would have all that information in it. I realize that would be a terrible pain in the neck. There might be some other way -- graphical way to illustrate the composition trends across oils. If that turns out to be important, I have a feeling there'll just be a cluster of points from C12-C18 for most of these. But we -- I think we just have to look.

DR. BRESLAWEC: May I ask a question? Dr. Liebler, if you look at Table 3, CIR Panel Book 33, as an example, the compositions as we -- as available are presented for a for a number of oils on those pages. Is that adequate in terms of composition for those oils?

DR. LIEBLER: Yes, that's fine.

DR. BRESLAWEC: Thank you.

DR. SLAGA: The fact that we want to combine nut oil and the edible plant oils, wouldn't this be the opportunity then to combine it all and try to get all the compositions at one time?

DR. BELSITO: Exactly.

DR. BERGFELD: Is there a general agreement to combine these two documents? It's sort of a straw vote, all those in favor --

DR. BELSITO: Yes.

DR. BERGFELD: Yes. Good. So, now we're needing a motion to how we're going to act

on this. Is it going to go insufficient, or is it going to go tabled, both for the same reason -- composition.

DR. BELSITO: Well, this is the first time we're looking at it, so go insufficient and try and get the composition data.

DR. BERGFELD: And so that's a motion? Motion? Is it seconded?

DR. BELSITO: Yes.

DR. MARKS: Second.

DR. BERGFELD: Any further discussion, then? Dr. Bailey, any discussion?

DR. BAILEY: No, I think these are reasonable explorations. I think the reality of ingredients that are botanical or isolated from natural sources is that the table is not going to be complete. But it's worth, you know, adding as many interests as we can, and then if we find patters that we're comfortable with, then that may suffice. But, you know, expanding the table, I think, is a reasonable step.

DR. BERGFELD: Thank you. Any other comments? Seeing none, call for the vote. All those in favor of going insufficient notice? Thank you, unanimous. So, we've now covered the nut oils as well, because they're being grouped with the plant oils. ~~We're moving on to triclosan. Dr. Belsito.~~

~~DR. BELSITO: Yes, triclosan. This is the first time that we're seeing the report, and I'd like to congratulate the CIR staff for taking a novel approach to what otherwise could have been an extremely overwhelming document, given the plethora of studies in the literature on this antimicrobial.~~

~~And the approach that the CIR took was first to identify issues surrounding triclosan -- safety issues where we'd like to key in. And those included the exposure -- so, how were we being exposed to it in cosmetics? Potential dioxin impurities, photostability in dioxin, photo products, carcinogenicity, potential endocrine disruption, and then the potential for the bacterial resistance.~~

Draft Final Report

Plant-Derived Fatty Acid Oils Group

March 4, 2011

The 2011 Cosmetic Ingredient Review Expert Panel members are: Chairman, Wilma F. Bergfeld, M.D., F.A.C.P.; Donald V. Belsito, M.D.; Curtis D. Klaassen, Ph.D.; Daniel C. Liebler, Ph.D.; Ronald A Hill, Ph.D. James G. Marks, Jr., M.D.; Ronald C. Shank, Ph.D.; Thomas J. Slaga, Ph.D.; and Paul W. Snyder, D.V.M., Ph.D. The CIR Director is F. Alan Andersen, Ph.D. This report was prepared by Christina L. Burnett and Monice Fiume.

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ABSTRACT

The CIR Expert Panel assessed the safety of 244 Plant-Derived Fatty Acid Oils as used in cosmetics. Oils are used in a wide variety of cosmetic products for their skin conditioning, occlusive, emollient, and moisturizing properties. Since many of these oils are edible, and their systemic toxicity potential low, the review of the Panel focused on their potential dermal effects. The Expert Panel concluded that 241 of the 244 Plant-Derived Fatty Acid Oils are safe as used in cosmetics. Chemical composition data, particularly fatty acid profiles, were absent for 3 of the oils; therefore, these oils were found to have insufficient data for a determination of safety.

INTRODUCTION

Oils derived from edible vegetables, fruits, seeds, and tree and ground nuts have been safely consumed by humans for millennia. While nuts and some fruits and vegetables themselves may cause allergic reactions in certain individuals, the refined oils derived from these plants generally pose no significant safety concern following oral exposure, and their general biology is well characterized due to extensive use in food materials. All of the ingredients in this report are mixtures of triglycerides containing fatty acids and fatty acid derivatives, the safety of which in cosmetics have been established. This safety assessment will focus solely on the basic chemistry, manufacturing/production, uses, and irritation and sensitization data available on these oils as they are used in cosmetic ingredients.

Various oils have been used on the skin since antiquity. Initially used for anointing in religious ceremonies, oils and their components have also been long used on the skin for cosmetic purposes. They are used in a wide variety of cosmetic products for their skin conditioning, occlusive, emollient, moisturizing and other properties. The full list of ingredients in this report, which includes oils, hydrogenated oils, unsaponifiables, oil fatty acids, and salts of the fatty acids, is found in Table 1. While a large number of oils derived from plants are included in this literature review, there is a commonality in that they all are mixtures of triglycerides containing fatty acids and fatty acid derivatives, the safety of which in cosmetics have been established.

In preparing this report, numerous inconsistencies were noted with both taxonomic and INCI naming conventions. For example, this report includes the macadamia nut ingredients, Macadamia Integrifolia Seed Oil and Macadamia Ternifolia Seed Oil, which are described in the International Cosmetic Ingredient Dictionary and Handbook.[1] The species *M. integrifolia* is currently the only species of macadamia nut that is used for oil production. The name *M. ternifolia* is an old naming convention for the edible nut that is currently used to describe a non-cultivated, inedible species.[2,3] Macadamia Integrifolia Seed Oil and Macadamia Ternifolia Seed Oil are the same ingredient. Similar naming conflicts have been discovered with Triticum Vulgare (Wheat) Germ Oil and Triticum Aestivum (Wheat) Germ Oil, Orbignya Oleifera Seed Oil and Orbignya Speciosa Kernel Oil, and Moringa Pterygosperma Seed Oil and Moringa Oleifera Seed Oil, with these pairs being synonyms for each other. The shea plant also has two species names, *Butyrospermum parkii* and *Vitellaria paradoxa*. Only *B. parkii* (as Butyrospermum Parkii [Shea] Oil or Butter) is the current naming convention described by the cosmetics industry.

This report includes cosmetic ingredients that have been previously reviewed by the Cosmetic Ingredient Review Expert Panel. The ingredients, their conclusions, and published citations are found in Table 2. Previously reviewed fatty acids and glyceryl triesters are also found in Table 2.

CHEMISTRY

The group of ingredients characterized as fats and oils are the glyceryl esters of fatty acids (triglycerides) normally found in plants, including those which have been hydrogenated to reduce or eliminate unsaturation.[4] Figure 1 represents the general structure of fats and oils. The raw oil may include diglycerides, monoglycerides, free fatty acids, plant sterols, pigments, glucosides, proteins, natural antioxidants, vitamins and impurities.[5,6] The extent to which these components are removed during processing varies. The available information on chemical properties of oils in this report, including Food Chemicals Codex

specifications when provided, are found in Table 3.[7] The available fatty acid compositions for the oils in this report are found in Table 4.

The percentage of chemical constituents in individual oil types is dependent on the region where the oilseed plant is grown, individual cultivars, and plant genetics.[6] This is especially true with rapeseed, where the erucic acid content varies from 1% to 58.6%. Low erucic acid rapeseed oil is also known as canola oil.

The nutritional content of these oils varies with oil type. For example, sunflower oil contains high levels of vitamins A, D, and K, while palm oil is a rich source of vitamins A and E. Crude sunflower oil also has the highest content of vitamin E in the form of α-tocopherol amongst vegetable oils.[6]

Vegetable Oil and Hydrogenated Vegetable Oil are cosmetic labeling names for blends of plant-derived oils.[8] The composition of a blend is determined by the desired physical properties. Vegetable Oil and Hydrogenated Vegetable Oil may include, but are not limited to: Canola Oil, Brassica Campestris (Rapeseed) Oil, Carthamus Tinctorius (Safflower) Seed Oil, Helianthus Annuus (Sunflower) Seed Oil, Sesamum Indicum (Sesame) Seed Oil, Elaeis Guineensis (Palm) Oil, Elaeis Guineensis (Palm Kernel) Oil, Cocos Nucifera (Coconut) Oil, Gossypium Herbaceum (Cottonseed) Oil, Glycine Soja (Soybean) Oil, Zea Mays (Corn) Oil, Olea Europaea (Olive) Oil, Prunus Amygdalus Dulcis (Sweet Almond) Oil, and hydrogenated products of these oils.

Processing

The oil may be directly expressed from the source (seed or pulp) followed by solvent extraction. *Bailey's Industrial Oil and Fat Products* states that the removal of pigments and polar materials is mandatory for most cosmetic applications.[9] The process used for oil refining for foods may be adequate for this purpose, or additional steps may be required. Special refining methods to yield colorless and odorless oils are used by the cosmetic industry and include proprietary adsorption chromatography and supercritical fluid extractions.

The majority of the oils presented in this report are produced either from mechanical extraction or solvent extraction or a hybrid of both methods, known as prepress solvent extraction.[6] In solvent extraction, hexane is the most commonly used solvent, as it is economical and easily removed from the extracted oil. Seeds that are rich in oil can be cold pressed to extract oil without the use of solvents.[10]

After the initial extraction by methods such as solvent extraction, the crude (degummed) oil is often refined.[6] The first step is treating the oil with caustic soda to neutralize free fatty acids, hydrolyze phosphatides, and remove some colored pigments and unsaponifiable materials. Soap stock is usually a by-product of this step. The next step involves treating the neutralized oil with activated earth to further adsorb pigments. The last major step in refining oil is deodorizing, usually by a type of steam distillation, which is intended to remove all oxidative cleavage products that impart odor or flavor to the oil. Deodorization also removes tocopherols, sterols, and other minor constituents of free fatty acids and undesirable foreign materials. Figure 2 is a flowchart of the basic refinement process.

After deodorization, oils can be further processed by hydrogenation, which makes oil more resistant to oxidative and thermal damage, and by winterization, where oil is slowly cooled to promote formation of crystals that cause cloudiness, and then filtered to remove the crystals.

Cosmetic grade fatty acid plant oils may include a physical refining step that involves heating crude oil under vacuum.[10] This step allows for the removal of volatile components such as color compounds, odor compounds, and free fatty acids, which gives the refined oil a lighter color, less odor, and lower acid values.

Analytical Methods

Near infrared spectroscopy and gas chromatography have been used, respectively, to phenotype and analyze fatty acid profiles in shea fat (described as *Vitellaria paradoxa*, not *Butyrospermum parkii*).[11] The fatty acid composition of hazel seed oil

(*Corylus avellana*, in crude form) has also been analyzed by gas chromatography.[12] The triacylglycerol and diacylglycerol composition oils from hazelnut, pistachio, almond, Brazil nut, and macadamia nuts have been characterized with high-performance liquid chromatography with atmospheric pressure chemical ionization and UV detection.[13] The triacylglycerol profile of Brazil nut oil has also been quantified using dry matrix-assisted laser desorption/ionization time-of flight mass spectrometry.[14]

Impurities

Proteins

Many edible fatty acid oils are derived from foods that are recognized as potent food allergens. It has been shown that often an individual that is allergic to a food will generally not react to the refined oil, especially if the oil has been "hot-pressed" or has undergone more processing.[15,16] A prime example is Arachis Hypogaea (Peanut) Oil. Peanuts are extremely allergenic to a large population, but reaction to the oil is rare. In its safety assessment on Arachis Hypogaea (Peanut) Oil, the Expert Panel noted that the major concern associated with allergic reactions to peanuts is the protein.[17] The protein does not partition into the refined oil, and therefore the oil is safe for use in cosmetics. However, researchers have reported protein levels in processed oils. Halsey et al. reported that Lowry protein determinations of cold-pressed and refined sunflower oil found 2-8 µg/ml protein,[18] while Zitouni et al. reported trace amounts of protein in the refined oil.[19] Olszewski et al. found 0.1-0.2 µg protein per g of peanut oil,[20] while Ramazzotti et al. reported finding IgE responsive residual proteins in peanut oil extracts.[21] Porras et al. found soy protein in some samples of soy oil, but not others.[22] Awazuhara et al. reported 1.4-4.0 µg protein per 100 g of soy oil.[23] Although Paschke et al. found approximately 35 µg/l protein content in refined soybean oil, no IgE-binding activity was detectable.[24]

While the Panel has found a general lack of clinical effects for fatty acid oils already reviewed,[17,25-33] other groups have raised concerns. The European Medicines Agency (EMEA) Working Party on Herbal Medicinal Products concluded that soy and peanut products "should be treated as allergenic unless they have an analytically-monitored non-allergenic specification and a safe maximum daily dose."[34] The EMEA found that threshold concentrations for induction of a protein contact dermatitis were not available and recommended, "all medications for topical use containing soya or peanut products should be treated as allergenic."

Aflatoxin

Aflatoxins are metabolic products of the molds *Aspergillus flavus* and *Aspergillus parasiticus*. They are most often produced in stored agricultural crops (such as peanuts and other nut crops) when growth conditions and genetic requirements are favorable.[35-37] The International Agency for Research on Cancer (IARC) categorized aflatoxins as group 1 agents, "carcinogenic to humans".[38,39]

The United States government places the following limitations on peanuts to be considered "negative" for aflatoxin: $\leq$ 15 ppb for "peanuts which have been certified as meeting edible quality grade requirements" and $\leq$ 25 ppb for "non-edible quality categories" (7 CFR Sections 997.30 and 998.200).[40]

> A study reported that crude peanut oil (obtained by solvent extraction or hydraulic pressing) has reduced aflatoxin concentration compared to peanut kernels, and that subsequent processing (alkali refining and bleaching) reduces the concentration still further.[17] In one example, processed peanut oil from moldy peanuts (contaminated with 5500 ppb aflatoxin) had an aflatoxin concentration of < 1ppb. [From CIR assessment on Arachis Hypogaea (Peanut) Oil, 2001.][17]
>
> In 50 samples of hazel nuts from Spain, all samples showed fungal contamination, but no aflatoxin contamination.[41] Of the 50 fungal strains identified, 25 were aflatoxigenic strains. In 20 hazel nut samples collected in Egypt, however, aflatoxin (25-175 µg/kg) was reported as a contaminant in 90% of samples. [From CIR assessment on Hazel Seed Oil, 2001.][42]
>
> Aflatoxin contamination of raw and dried coconut copra has been reported.[33] Improper drying, handling, and storage greatly increase the possibility of contamination by aflatoxins growing on copra. Smoke drying of copra inhibited aflatoxin formation. [From CIR assessment on Cocos Nucifera (Coconut) Oil, 2008.][43]

Glycidol

Glycidol and glycidol fatty acid esters have been detected in refined fatty acid oils.[44-47]

USE

Cosmetic

There are 244 oil ingredients included in this safety assessment, 146 of which are reported to be used; 118 of the in-use ingredients have never been reviewed by CIR, while 28 have been reviewed previously. For the ingredients being reviewed for the first time, the frequency of use, as supplied to the Food and Drug Administration (FDA) by industry as part of the Voluntary Cosmetic Registration Program (VCRP),[48] and/or concentration of use, as supplied by industry in response to a Personal Care Products Council (Council) survey,[49-51] can be found in Table 5a. (Also included in Table 5a are three ingredients, Citrullus Vulgaris (Watermelon) Seed Oil, Macadamia Nut Oil, and Vaccinium Oxycoccos (Cranberry) Seed Oil, that do not have identifiable International Nomenclature Cosmetic Ingredient (INCI) names. While these ingredients are not part of this assessment, they are very similar to the oils that are identified and information on them is included in this report for completeness.) For the ingredients that have been reviewed previously, the current and historical[26-28,32,52-55] frequency and concentration of use is given in Table 5b. The 98 ingredients not currently reported to be used are listed in Table 5c. [48-51,56,57]

It should be noted that the names vegetable oil and hydrogenated vegetable oil, are used in cosmetic formulations, refer to a blend of plant-derived oils, and the composition of the blend varies.[8]

Of the oils included in this report, Butyrospermum Parkii (Shea) Butter has the most reported uses in cosmetic and personal care products, with a total of 1950; 1680 of those uses are in leave-on formulations. A recent survey of use concentrations for Butyrospermum Parkii (Shea) Butter reports a maximum use concentration of 60% in leave-on products as a cuticle softener, a manicuring application.[58] Helianthus Annuus (Sunflower) Seed Oil has the second greatest number of overall uses reported, with a total of 1414; 1054 of those uses are in leave-on formulations, having use concentrations up to 96%. Many other ingredients are used in an extensive number of formulations. For example, Prunus Amygdalus Dulcis (Sweet Almond) Oil, Olea Europaea (Olive) Fruit Oil, and Glycine Soja (Soybean) Oil have 1127, 915, and 912 uses, respectively. Most of the in-use ingredients have uses in both leave-on and rinse-off product types, many are used in products that are applied around the eye and some are used in a way they can possibly be ingested. Some are used in products that involve mucous membrane exposure, and a few are used in underarm deodorant formulations. Many of the products are used in formulations at relatively high concentrations. Olea Europaea (Olive) Fruit Oil is used at up to 100%, Persea Gratissima (Avocado) Oil is used at up to 98%, Helianthus Annuus (Sunflower) Seed Oil at up to 96%, and Glycine Soja (Soybean) Oil at 95%.

Oils are used in a wide variety of cosmetic products for their skin conditioning, occlusive, emollient, moisturizing and other properties. The oil ingredients described in this report may be used in hair sprays, and effects on the lungs that may be induced by aerosolized products containing these ingredients are of concern.

The aerosol properties that determine deposition in the respiratory system are particle size and density. The parameter most closely associated with deposition is the aerodynamic diameter, d_a, defined as the diameter of a sphere of unit density possessing the same terminal settling velocity as the particle in question. In humans, particles with an aerodynamic diameter of $\leq$ 10μm are respirable. Particles with a d_a from 0.1 - 10μm settle in the upper respiratory tract and particles with a $d_a < 0.1$ μm settle in the lower respiratory tract.[59,60]

Particle diameters of 60-80 μm and ≥80 μm have been reported for anhydrous hair sprays and pump hairsprays, respectively.[61] In practice, aerosols should have at least 99% of their particle diameters in the 10 – 110 μm range and the mean

particle diameter in a typical aerosol spray has been reported as ~38 μm.[62] Therefore, most aerosol particles are deposited in the nasopharyngeal region and are not respirable.

None of the oils, hydrogenated oils, unsaponifiables, oil fatty acids, and salts of the fatty acids described in this report were restricted from use in any way under the rules governing cosmetic products in the European Union.[63]

Non-Cosmetic

The primary uses for plant-derived fatty acid oils are for cooking. Palm oil is the world's most widely consumed edible oil (41.7 million metric tons), followed by soybean oil, rapeseed oil, sunflower seed oil, cottonseed oil, peanut oil, palm kernel oil, coconut oil, ,and olive oil.[6,64] Non-food, non-cosmetic uses for edible fatty acid oils are found in Table 6.

ANIMAL TOXICOLOGY

Many of the fatty acid oils in this assessment are edible, and exposure to the oils from food use would result in a much larger systemic dose that that resulting from use in cosmetic products. Consequently, their systemic toxicity potential is not addressed in this report. The safety focus of use of these oils as cosmetic ingredients is on the potential for irritation and sensitization.

CARCINOGENICITY

The safety of glycidol fatty acid esters in refined vegetable oils was assessed by IARC. Glycidol was determined to be a Group2A (probably carcinogenic to humans) chemical while glycidol fatty acid esters was determined to be a Group 3 (not classifiable as to carcinogenicity to humans) chemical.[46,47]

The Federal Institute for Risk Assessment in Germany released a summary of their initial evaluation of the assessment of levels of glycidol fatty acid esters detected in refined vegetable fats.[45] While acknowledging that the levels of glycidol that may be released from glycidol fatty acid esters are not known, the evaluation noted that glycidol is classified as probably carcinogenic to humans. The evaluation was based on findings of the German Chemical and Veterinary Test Agency (CVUA) that noted that glycidol is converted to 3-chloropropanediol and it appeared to be the 3-chloropropanediol that was detected in the vegetable fat.[44] The levels of 3-chloropropanediol were negligible at the crude oil, degummed, neutralized, and bleached stages, but levels were significant at the deodorized stage.

Anacardium Occidentale (Cashew) Seed Oil

Singh et al. investigated the modulatory effect of Anacardium Occidentale (Cashew) Seed Oil on antioxidant potential in female Swiss albino mice in a 120 day skin papillomagenesis study.[65] The mice were divided into 4 groups of 15 and 1 group of 10 (vehicle control). Test groups were as follows: Group I was the vehicle control, receiving 0.1 ml acetone; Group II was the positive control, receiving a single dose of 7,12-dimethylbenz(a)anthracene (DMBA) (0.005 mg/0.05 ml acetone) followed by applications of 2% croton oil 3 times a week until study termination; Group III received a single dose of DMBA followed by applications of 2.5% cashew nut kernel oil 3 times a week until study termination; Group IV received a single dose of DMBA followed by applications of 5% cashew nut kernel oil 3 times a week until study termination; and Group V was 5% cashew nut kernel oil applied until study termination. The oil was applied to the clipped dorsal scapular region that was 2 cm in diameter. Body weights were recorded at regular intervals. Skin papillomas greater than 1 mm in diameter at the application sites were recorded weekly and included in the data analysis if they persisted for more than 2 weeks. The positive control group yielded expected results (86% tumor incidence). No tumors were observed in the vehicle control or the other test groups. The authors concluded that cashew nut kernel oil did not exhibit any solitary carcinogenic activity.

IRRITATION AND SENSITIZATION

Dermal Effects

Non-Human

Dermal irritation and sensitization studies were performed in animals on a number of the plant-derived fatty acid oils, and the results were mostly negative in all of the studies. These studies are summarized in Table 7. Photosensitization data, when available, are also included in Table 7. None of the tested oils were phototoxic. Any comedogenic studies in animals are also included in Table 7.

Human

Plant-derived fatty acid oils are commonly believed to be safe for use on the skin.[9] de Groot notes that no documentation exists to show that high quality edible lipids cause adverse reactions in normal individuals (except for potential comedogenicity).[66] Very few reports of adverse reactions to cosmetic use of edible fatty acid oils have been reported.

Many plant-derived fatty acid oils are derived from foods that are recognized as potent food allergens. The allergic reactions are thought to be caused by the proteins present in the food. It has been shown that often an individual that is allergic to a food will generally not react to the refined oil, especially if the oil has been "hot-pressed" or has undergone more processing.[15,16] In its safety assessment on Arachis Hypogaea (Peanut) Oil, the CIR Expert Panel noted that while peanuts are extremely allergenic to a large population, reaction to the oil is rare . Because the major concern associated with allergic reactions to peanuts is the protein[17] which does not partition into the refined oil; therefore the oil is safe for use in cosmetics. Crevel et al. also concluded that chemically refined peanut oil is safe for the majority of peanut allergic individuals.[16] They stated that "as peanut is acknowledged to be one of the most potent food allergens, it is reasonable to extrapolate the conclusions drawn up for peanut oil to other edible oils." However, they concede that validated analytical methodology for establishing the protein content of oil is needed.

In support of the conclusions stated earlier, Crevel et al. also examined the allergenicity of some other oils. Very few instances of allergic reactions to other major edible fatty acid oils have been reported. Even sesame oil, which differs from the other oils in that it is used as a flavorant and, therefore, is not as refined and is expected to contain significantly more protein that the other edible fatty acid oils, has had very few reports of allergic reaction. Additional studies demonstrating safety are summarized later in this section.[18,67]

A large amount of clinical irritation and sensitization studies were made available on many of the oils, primarily in formulation, and these studies are summarized in Table 8. All of the data indicated that the oils were not irritants or sensitizers. Also included in this table are summary statements of findings from CIR reports of oils that have previously been reviewed.

Summary statements on phototoxicity/photosensitization data from CIR reports of oils that have previously been reviewed are also included in Table 8. Also included are the results of a comedogenicity study.

Mucosal Irritation

Non-Human

Ocular irritation studies were performed using animals on a number of plant-derived fatty acid oils. While the majority of the oils were non-irritating to mildly irritating, Crambe Abyssinica Seed Oil was an ocular irritant and Linum Usitatissimum (Linseed) Seed Oil was moderately irritating. Available ocular irritation studies are summarized in Table 9.

Human

In clinical ocular irritation studies, Linum Usitatissimum (Linseed) Oil and Ribes Nigrum (Black Currant) Seed Oil did not produce adverse reactions, and were considered safe for contact lens wearers. These studies are also summarized in Table 9.

CLINICAL USE

Clinical Trials/Case Studies

Various case studies have been summarized for a number of the oils included in this report. Since various effects were reported for different oils, please refer to Table 10 for this information.

SUMMARY

The report addresses the safety of Plant-Derived Fatty Acid Oils. These oils, which are derived from vegetable and fruit plants, are composed of mono-, di-, and, primarily, triglycerides, free fatty acids and other minor components, including natural antioxidants and fat-soluble vitamins. The percentage of chemical constituents and nutritional content of individual oil types is dependent on region where the oil plant is grown, individual cultivars, and plant genetics. Oils used in cosmetics are likely produced in the same manner as those used in the food industry. Oils may be expressed through mechanical or solvent extraction. The oils may undergo further refining, such as neutralizing, bleaching, and deodorizing, to remove pigments, odors, unsaponifiable materials, and other undesirables.

Individuals who have food allergies to a plant protein rarely exhibit allergic reactions when exposed to refined oils of the same plant. Data evaluation by the CIR Expert Panel regarding method of manufacture indicates that protein constituents do not partition into the refined oils. The CIR Expert Panel also has found a general lack of clinical effects for fatty acid oils that they have already reviewed; however, other researchers have raised concerns about the presence of residual proteins in oils, such as peanut and soy.

Glycidol fatty acid esters are possible impurities in refined vegetable oils. While the amount of glycidol that may be present with glycidol fatty acid esters is not known, the IARC has noted that glycidol is probably carcinogenic to humans and that glycidol fatty acid esters are not classifiable as to carcinogenicity in humans. Peanuts and soy may contain aflatoxins, metabolic products of certain molds that are carcinogenic to humans.

Of the oils described in this report, Butyrospermum Parkii (Shea) Butter has the most reported uses in cosmetic and personal care products with a total of 1950 and is used at a maximum concentration of 60%. Oils are used in a wide variety of cosmetic products, including use in hair spray and other aerosolized products. None of the oils, or the related counterparts, described in this report were restricted from use in the European Union.

Anacardium Occidentale (Cashew) Seed Oil was not a tumor promoter in a DMBA skin test system.

The safety focus of use of these oils as cosmetic ingredients is on the potential for irritation and sensitization. Undiluted, technical grade, Arachis Hypogaea (Peanut) Oil was moderately irritating to rabbits and guinea pig skin, and 5% aq. solutions of a bar soap containing 13% sodium cocoate had irritation scores of 1.6-4.0/8 in animal studies. However, the remaining animal and clinical irritation and/or sensitization studies conducted on a large number of the oils included in this report, primarily in formulation, did not report any significant irritation or sensitization reactions, indicating that refined oils derived from plants are not dermal irritants or sensitizers.

The phototoxic potential of Butyrospermum Parkii (Shea) Butter, Elaeis Guineensis (Palm) Oil, Oryza Sativa (Rice) Bran and (Rice) Germ Oil was evaluated in animal studies, and the phototoxic potential of Cocos Nucifera (Coconut) Oil, Sodium Cocoate, Prunus Amygdalus Dulcis (Sweet) Almond Oil, and Oryza Sativa (Rice) Bran Oil was examined clinically. None of these ingredients were phototoxic.

The comedogenicity of Corylus Avellana (Hazel) Seed Oil was evaluated using rabbits, and a slight difference in the number and size of the pilosebaceous follicles and a slight excess of sebum and a dilation of the follicles was observed. In clinical

testing with an eye mask containing 0.2% Ribes Nigrum (Black Currant) Seed Oil (undiluted), the formulation was non-comedogenic.

The ocular irritation potential of a number of the oils, mostly in formulation, was evaluated in testing using animals or alternative assays. The majority of the test results did not report significant ocular irritation. A lotion containing 1.5% Elaeis Guineensis (Palm) Oil was moderately irritating to rabbit eyes, and a mascara containing 9.4% Linum Usitatissimum (Linseed) Seed Oil was moderately irritating in an alternative assay.

In human testing, a mascara containing 9.4% Linum Usitatissimum (Linseed) Seed Oil did not produce ocular irritation or adverse effects in contact lenses wearers or subjects with sensitive eyes. An eye mask containing 0.2% Ribes Nigrum (Black Currant) Seed Oil (undiluted) was considered ophthalmologist tested and safe for contact lens wearers.

DISCUSSION

Plant-derived fatty acid oils, which are the glyceryl esters of fatty acid (triglycerides) normally found in plants, including those which have been hydrogenated to reduce or eliminate unsaturation, were reviewed by the CIR Expert Panel. Upon review of these ingredients, the Panel expressed concern regarding pesticide residues and heavy metals that may be present in botanical ingredients. They stressed that the cosmetics industry should continue to use the necessary procedures to limit these impurities in the ingredient before blending into cosmetic formulation.

Additionally, the Panel considered the safety of glycidol and glycidol fatty acid esters in refined vegetable oils. While the Panel recognizes that these impurities may be carcinogenic, absorption through the skin would be very low and likely does not pose the same hazard as through ingestion. Nonetheless, suppliers should take steps to eliminate or reduce the presence of glycidol and glycidol fatty acid esters in plant-based fatty acid oils that are used in cosmetic products. Aflatoxins, potent carcinogens, may be present in moldy nuts and coconut copra, but are not found in oils expressed from these nuts and copra. The Panel adopted the USDA designation of $\leq$ 15 ppb as corresponding to "negative" aflatoxin content.

Some of the fatty acid oils are used in formulations that can be inhaled. The potential adverse effects of inhaled aerosols depend on the specific chemical species, the concentration and the duration of the exposure and their site of deposition within the respiratory system. In practice, aerosols should have at least 99% of their particle diameters in the 10 – 110 μm range and the mean particle diameter in a typical aerosol spray has been reported as ~38 μm. Particles with an aerodynamic diameter of ≤ 10μm are respirable. In absence of inhalation toxicity data, the panel determined that plant-derived fatty acid oils can be used safely in hair sprays, because the product particle size is not respirable.

The relationship between food allergies and exposure to refined oils was discussed by the Panel. Individuals who have food allergies to a plant protein rarely elicit allergic reactions when exposed to refined oils of the same plant. The Panel has found a general lack of clinical effects for plant-derived fatty acid oils already reviewed.

The Expert Panel discussed the fact that arachidonic acid, a cosmetic ingredient with a CIR conclusion of insufficient safety, is part of the fatty acid composition of Lycium Barbarum Seed Oil, Oryza Sativa (Rice) Germ Oil, and Sclerocarya Birrea Seed Oil. The Panel was of the opinion that the concentration of use of these ingredients was sufficiently low, as would be the amount of free arachidonic acid, as to not warrant concern.

Fatty acid composition data were available for the majority of the oils included in this review, and the Panel agreed that the composition data, in combination with the available data on method of manufacture, impurities, safety test data, a long history of safe use in foods, and an absence of adverse reactions in clinical experience, was a sufficient basis for determining safety.

However, composition data, specifically fatty acid profiles, were not available for all of the plant-derived fatty acid oils, and as such, the Expert Panel could not make a determination of safety on those oils. The oils for which the data were insufficient are:

Fragaria Chiloensis (Strawberry Seed Oil
Fragaria Vesca (Strawberry) Seed Oil
Fragaria Virginiana (Strawberry) Seed Oil

The Expert Panel did note that vegetable oil is a blend of a number of different oils, and a specific composition of vegetable oil was not available. The Expert Panel determined that the safety of vegetable oil as used in cosmetic formulations has been established, providing that the blend contains oils for which the fatty acid composition is known.

CONCLUSION

The CIR Expert Panel concluded that 241 of the 244 plant-derived fatty acid oils included in this review are safe in the present practices of use and concentration described in this safety assessment. Were the ingredients not in current use (as indicated by *) to be used in the future, the expectation is that they would be used in product categories and concentrations comparable to others in these groups. The ingredients found safe are:

Actinidia Chinensis (Kiwi) Seed Oil
Adansonia Digitata Oil
Adansonia Digitata Seed Oil*
Aleurites Moluccanus Bakoly Seed Oil*
Aleurities Moluccana Seed Oil
Amaranthus Hypochondriacus Seed Oil*
Anacardium Occidentale (Cashew) Seed Oil
Arachis Hypogaea (Peanut) Oil
Arctium Lappa Seed Oil*
Argania Spinosa Kernel Oil
Astrocaryum Murumuru Seed Butter
Avena Sativa (Oat) Kernel Oil
Babassu Acid*
Bassia Butyracea Seed Butter*
Bassia Latifolia Seed Butter
Bertholletia Excelsa Seed Oil
Borago Officinalis Seed Oil
Brassica Campestris (Rapeseed) Oil Unsaponifiables*
Brassica Campestris (Rapeseed) Seed Oil
Brassica Napus Seed Oil*
Brassica Oleracea Acephala Seed Oil*
Brassica Oleracea Italica (Broccoli) Seed Oil
Butyrospermum Parkii (Shea) Butter
Butyrospermum Parkii (Shea) Butter Unsaponifiables
Butyrospermum Parkii (Shea) Oil
Camelina Sativa Seed Oil
Camellia Japonica Seed Oil
Camellia Kissi Seed Oil
Camellia Oleifera Seed Oil
Camellia Sinensis Seed Oil
Canarium Indicum Seed Oil*
Canola Oil
Canola Oil Unsaponifiables
Carica Papaya Seed Oil
Carthamus Tinctorius (Safflower) Seed Oil
Carya Illinoensis (Pecan) Seed Oil*
Caryocar Brasiliense Fruit Oil
Chenopodium Quinoa Seed Oil
Citrullus Lanatus (Watermelon) Seed Oil
Citrus Aurantifolia (Lime) Seed Oil*
Citrus Aurantifolia (Lime) Seed Oil Unsaponifiables*
Citrus Aurantium Dulcis (Orange) Seed Oil*
Citrus Aurantium Dulcis (Orange) Seed Oil Unsaponifiables*
Citrus Grandis (Grapefruit) Seed Oil*
Citrus Grandis (Grapefruit) Seed Oil Unsaponifiables*
Citrus Limon (Lemon) Seed Oil*
Citrus Paradisi (Grapefruit) Seed Oil
Coconut Acid
Cocos Nucifera (Coconut) Oil
Cocos Nucifera (Coconut) Seed Butter*
Coix Lacryma-Jobi (Job's Tears) Seed Oil*
Corn Acid*
Corylus Americana (Hazel) Seed Oil
Corylus Avellana (Hazel) Seed Oil
Cottonseed Acid*
Crambe Abyssinica Seed Oil
Cucumis Sativus (Cucumber) Seed Oil
Cucurbita Pepo (Pumpkin) Seed Oil
Cynara Cardunculus Seed Oil*
Elaeis (Palm) Fruit Oil*
Elaeis Guineensis (Palm) Butter*
Elaeis Guineensis (Palm) Kernel Oil
Elaeis Guineensis (Palm) Oil
Elaeis Oleifera Kernel Oil
Euterpe Oleracea Fruit Oil
Fragaria Ananassa (Strawberry) Seed Oil*
Garcinia Indica Seed Butter
Gevuina Avellana Seed Oil
Gevuina Avellana Oil
Glycine Soja (Soybean) Oil
Glycine Soja (Soybean) Oil Unsaponifiables
Gossypium Herbaceum (Cotton) Seed Oil
Guizotia Abyssinica Seed Oil*
Helianthus Annuus (Sunflower) Seed Oil
Helianthus Annuus (Sunflower) Seed Oil Unsaponifiables
Hippophae Rhamnoides Fruit Oil
Hippophae Rhamnoides Oil
Hippophae Rhamnoides Seed Oil*
Hydrogenated Adansonia Digitata Seed Oil*
Hydrogenated Apricot Kernel Oil
Hydrogenated Apricot Kernel Oil Unsaponifiables*
Hydrogenated Argania Spinosa Kernel Oil*
Hydrogenated Avocado Oil
Hydrogenated Black Currant Seed Oil*

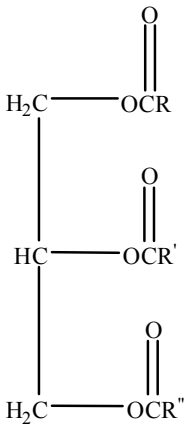
Hydrogenated Camelina Sativa Seed Oil*
Hydrogenated Camellia Oleifera Seed Oil
Hydrogenated Canola Oil
Hydrogenated Coconut Acid
Hydrogenated Coconut Oil
Hydrogenated Cottonseed Oil
Hydrogenated Cranberry Seed Oil*
Hydrogenated Evening Primrose Oil
Hydrogenated Grapefruit Seed Oil*
Hydrogenated Grapefruit Seed Oil Unsaponifiables*
Hydrogenated Grapeseed Oil
Hydrogenated Hazelnut Oil*
Hydrogenated Kukui Nut Oil*
Hydrogenated Lime Seed Oil*
Hydrogenated Lime Seed Oil Unsaponifiables*
Hydrogenated Macadamia Seed Oil*
Hydrogenated Meadowfoam Seed Oil*
Hydrogenated Olive Oil
Hydrogenated Olive Oil Unsaponifiables
Hydrogenated Orange Seed Oil*
Hydrogenated Orange Seed Oil Unsaponifiables*
Hydrogenated Palm Acid*
Hydrogenated Palm Kernel Oil
Hydrogenated Palm Oil
Hydrogenated Passiflora Edulis Seed Oil*
Hydrogenated Peach Kernel Oil*
Hydrogenated Peanut Oil
Hydrogenated Pistachio Seed Oil*
Hydrogenated Pumpkin Seed Oil*
Hydrogenated Punica Granatum Seed Oil*
Hydrogenated Rapeseed Oil*
Hydrogenated Raspberry Seed Oil
Hydrogenated Rice Bran Oil*
Hydrogenated Rosa Canina Fruit Oil*
Hydrogenated Safflower Seed Oil*
Hydrogenated Sesame Seed Oil*
Hydrogenated Shea Butter
Hydrogenated Soybean Oil
Hydrogenated Sunflower Seed Oil
Hydrogenated Sweet Almond Oil
Hydrogenated Sweet Almond Oil Unsaponifiables*
Hydrogenated Vegetable Oil
Hydrogenated Wheat Germ Oil*
Hydrogenated Wheat Germ Oil Unsaponifiables*
Irvingia Gabonensis Kernel Butter
Juglans Regia (Walnut) Seed Oil
Limnanthes Alba (Meadowfoam) Seed Oil
Linseed Acid
Linum Usitatissimum (Linseed) Seed Oil
Luffa Cylindrica Seed Oil
Lupinus Albus Oil Unsaponifiables*
Lupinus Albus Seed Oil
Lycium Barbarum Seed Oil
Macadamia Integrifolia Seed Oil
Macadamia Ternifolia Seed Oil
Magnesium Cocoate
Mangifera Indica (Mango) Seed Butter
Mangifera Indica (Mango) Seed Oil
Morinda Citrifolia Seed Oil*
Moringa Oleifera Seed Oil
Moringa Pterygosperma Seed Oil
Oenothera Biennis (Evening Primrose) Oil
Olea Europaea (Olive) Husk Oil*
Olea Europaea (Olive) Oil Unsaponifiables
Olea Europaea (Olive) Fruit Oil
Olive Acid*
Orbignya Cohune Seed Oil
Orbignya Oleifera Seed Oil
Orbignya Speciosa Kernel Oil
Oryza Sativa (Rice) Bran Oil
Oryza Sativa (Rice) Germ Oil
Oryza Sativa (Rice) Seed Oil*
Palm Acid
Palm Kernel Acid
Passiflora Edulis Seed Oil
Peanut Acid*
Perilla Ocymoides Seed Oil
Persea Gratissima (Avocado) Butter
Persea Gratissima (Avocado) Oil
Persea Gratissima (Avocado) Oil Unsaponifiables
Pistacia Vera Seed Oil
Plukenetia Volubilis Seed Oil
Potassium Babassuate*
Potassium Cocoate
Potassium Cornate*
Potassium Hydrogenated Cocoate*
Potassium Hydrogenated Palmate*
Potassium Olivate
Potassium Palm Kernelate
Potassium Palmate
Potassium Peanutate
Potassium Rapeseedate*
Potassium Safflowerate*
Potassium Soyate*
Prunus Amygdalus Dulcis (Sweet Almond) Oil
Prunus Amygdalus Dulcis (Sweet Almond) Oil Unsaponifiables*
Prunus Armeniaca (Apricot) Kernel Oil
Prunus Armeniaca (Apricot) Kernel Oil Unsaponifiables*
Prunus Avium (Sweet Cherry) Seed Oil
Prunus Domestica Seed Oil
Prunus Persica (Peach) Kernel Oil
Punica Granatum Seed Oil
Pyrus Malus (Apple) Seed Oil
Rapeseed Acid*
Ribes Nigrum (Black Currant) Seed Oil
Ribes Rubrum (Currant) Seed Oil*
Rice Bran Acid*
Rosa Canina Fruit Oil
Rubus Chamaemorus Seed Oil
Rubus Idaeus (Raspberry) Seed Oil
Safflower Acid*
Schinziophyton Rautanenii Kernel Oil
Sclerocarya Birrea Seed Oil
Sesamum Indicum (Sesame) Oil Unsaponifiables
Sesamum Indicum (Sesame) Seed Butter*
Sesamum Indicum (Sesame) Seed Oil
Silybum Marianum Seed Oil [Thistle]
Sodium Astrocaryum Murumuruate
Sodium Avocadoate
Sodium Babassuate
Sodium Cocoa Butterate*
Sodium Cocoate
Sodium Grapeseedate
Sodium Hydrogenated Cocoate*
Sodium Hydrogenated Palmate*
Sodium Macadamiaseedate*
Sodium Mangoseedate
Sodium Olivate
Sodium Palm Kernelate
Sodium Palmate
Sodium Peanutate*
Sodium Rapeseedate*

Sodium Safflowerate*
Sodium Sesameseedate
Sodium Soyate*
Sodium Sweet Almondate
Sodium Theobroma Grandiflorum Seedate*
Solanum Lycopersicum (Tomato) Fruit Oil
Solanum Lycopersicum (Tomato) Seed Oil
Soy Acid*
Sunflower Seed Acid*
Theobroma Cacao (Cocoa) Seed Butter
Theobroma Grandiflorum Seed Butter
Torreya Nucifera Seed Oil*
Triticum Aestivum (Wheat) Germ Oil*
Triticum Vulgare (Wheat) Germ Oil
Triticum Vulgare (Wheat) Germ Oil Unsaponifiables*
Vaccinium Corymbosum (Blueberry) Seed Oil*
Vaccinium Macrocarpon (Cranberry) Seed Oil
Vaccinium Myrtillus Seed Oil
Vaccinium Vitis-Idaea Seed Oil
Vegetable (Olus) Oil
Vitis Vinifera (Grape) Seed Oil
Wheat Germ Acid
Zea Mays (Corn) Germ Oil
Zea Mays (Corn) Oil
Zea Mays (Corn) Oil Unsaponifiables

The data are insufficient to make a determination that the following 3 ingredients are safe under the intended conditions of use:

Fragaria Chiloensis (Strawberry Seed Oil*
Fragaria Vesca (Strawberry) Seed Oil*
Fragaria Virginiana (Strawberry) Seed Oil*

FIGURES AND TABLES



-OCR, -OCR', and -OCR" may be the same or different fatty acid radicals.

Figure 1. General structure of fats and oils
(Reference[4])

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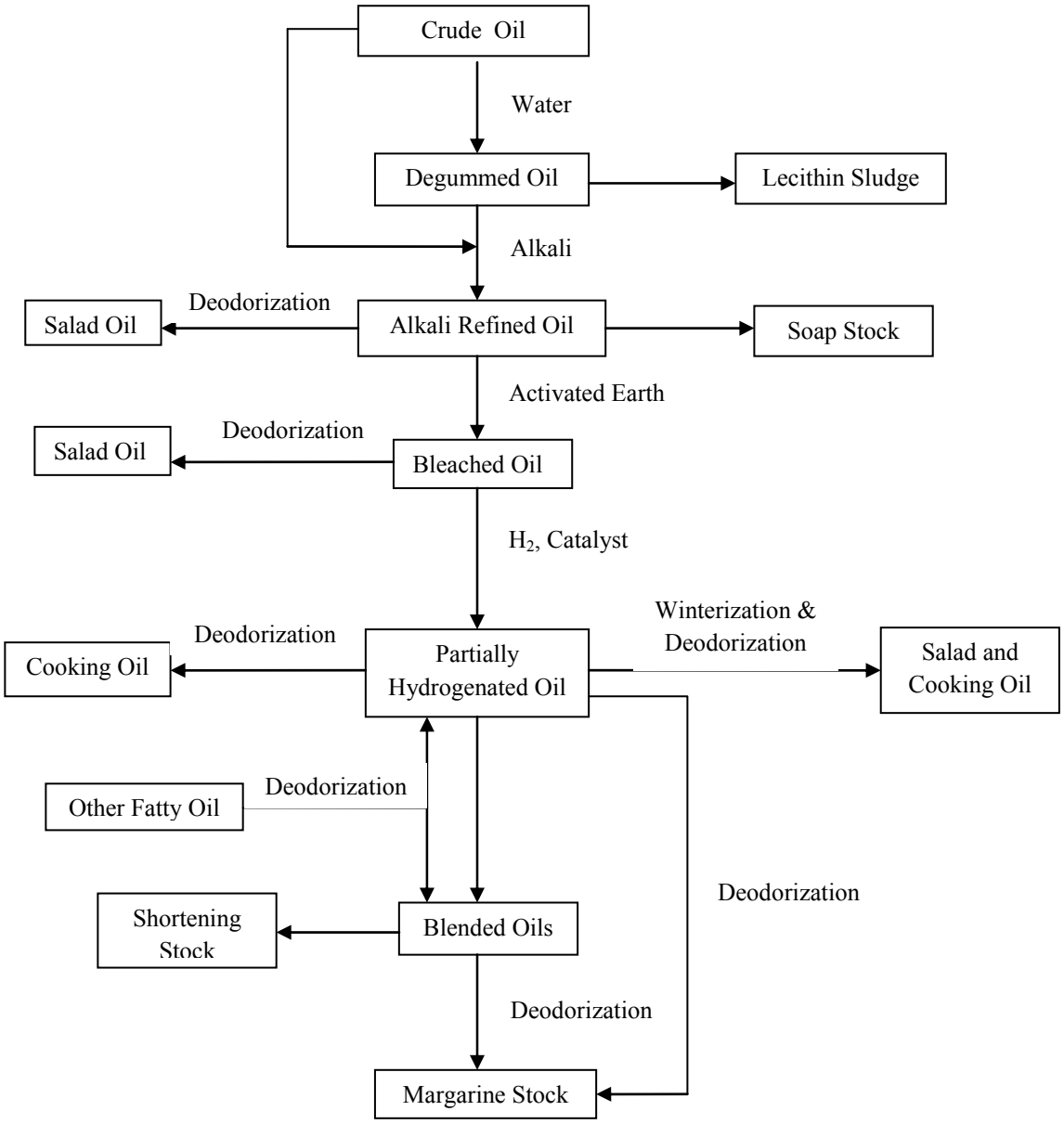

Figure 2. Basic oil refinement flowchart
(Reference.[6])

Table 1. Plant-derived fatty acid oils**.**

Actinidia Chinensis (Kiwi) Seed Oil
Adansonia Digitata Oil [Baobab]
  Adansonia Digitata Seed Oil
  Hydrogenated Adansonia Digitata Seed Oil
Aleurities Moluccana Seed Oil [Kukui] (CAS No. 8015-80-3)
  Hydrogenated Kukui Nut Oil
  Aleurites Moluccanus Bakoly Seed Oil
Amaranthus Hypochondriacus Seed Oil [Amaranth]
Anacardium Occidentale (Cashew) Seed Oil (CAS No. 8007-24-7)
Arachis Hypogaea (Peanut) Oil (CAS No. 8002-03-7)[a]
  Hydrogenated Peanut Oil (CAS No. 68425-36-5)
  Potassium Peanutate
  Sodium Peanutate
  Peanut Acid (CAS No. 91051-35-3)
Arctium Lappa Seed Oil [Burdock]
Argania Spinosa Kernel Oil [Argan]
  Hydrogenated Argania Spinosa Kernel Oil
Astrocaryum Murumuru Seed Butter [Murumuru]
  Sodium Astrocaryum Murumuruate
Avena Sativa (Oat) Kernel Oil
Bassia Butyracea Seed Butter
Bassia Latifolia Seed Butter [Mahwa]
Bertholletia Excelsa Seed Oil [Brazil]
Borago Officinalis Seed Oil [Borage] (CAS No. 225234-12-8)
Brassica Campestris (Rapeseed) Seed Oil
  Brassica Campestris (Rapeseed) Oil Unsaponifiables
  Hydrogenated Rapeseed Oil
  Rapeseed Acid
  Potassium Rapeseedate
  Sodium Rapeseedate
Brassica Napus Seed Oil [Rapeseed]
Brassica Oleracea Acephala Seed Oil [Kale]
Brassica Oleracea Italica (Broccoli) Seed Oil
Butyrospermum Parkii (Shea) Oil
  Butyrospermum Parkii (Shea) Butter (CAS No. 68920-03-6;194043-92-0)
  Butyrospermum Parkii (Shea) Butter Unsaponifiables
    (CAS No. 194043-92-0; 225234-14-0)
  Hydrogenated Shea Butter
Camelina Sativa Seed Oil [False Flax]
  Hydrogenated Camelina Sativa Seed Oil
Camellia Japonica Seed Oil
Camellia Kissi Seed Oil [Tea]
Camellia Oleifera Seed Oil [Tea Seed]
  Hydrogenated Camellia Oleifera Seed Oil
Camellia Sinensis Seed Oil
Canarium Indicum Seed Oil [Galip]
Canola Oil
  Canola Oil Unsaponifiables
  Hydrogenated Canola Oil
Carica Papaya Seed Oil [Papaya]
Carthamus Tinctorius (Safflower) Seed Oil
  Hydrogenated Safflower Seed Oil
  Potassium Safflowerate
  Sodium Safflowerate
  Safflower Acid
Carya Illinoensis (Pecan) Seed Oil
Caryocar Brasiliense Fruit Oil [Pequi]
Chenopodium Quinoa Seed Oil [Quinoa]
Citrullus Lanatus (Watermelon) Seed Oil
Citrus Aurantifolia (Lime) Seed Oil
  Citrus Aurantifolia (Lime) Seed Oil Unsaponifiables
  Hydrogenated Lime Seed Oil
  Hydrogenated Lime Seed Oil Unsaponifiables
Citrus Aurantium Dulcis (Orange) Seed Oil
  Citrus Aurantium Dulcis (Orange) Seed Oil Unsaponifiables
  Hydrogenated Orange Seed Oil
  Hydrogenated Orange Seed Oil Unsaponifiables
Juglans Regia (Walnut) Seed Oil (CAS No. 8024-09-7)
Limnanthes Alba (Meadowfoam) Seed Oil (CAS No. 153065-40-8)
  Hydrogenated Meadowfoam Seed Oil
Linum Usitatissimum (Linseed) Seed Oil (CAS No. 8001-26-1)
Citrus Grandis (Grapefruit) Seed Oil
  Citrus Grandis (Grapefruit) Seed Oil Unsaponifiables
  Hydrogenated Grapefruit Seed Oil
  Hydrogenated Grapefruit Seed Oil Unsaponifiables
Citrus Paradisi (Grapefruit) Seed Oil
Citrus Limon (Lemon) Seed Oil (CAS No. 85085-28-5)
Cocos Nucifera (Coconut) Oil (CAS No. 8001-31-8)
  Hydrogenated Coconut Oil (CAS No. 84836-98-6)
  Cocos Nucifera (Coconut) Seed Butter
  Magnesium Cocoate
  Potassium Cocoate (CAS No. 61789-30-8)
  Potassium Hydrogenated Cocoate
  Sodium Cocoate (CAS No. 61789-31-9)
  Sodium Hydrogenated Cocoate
  Coconut Acid (CAS No. 61788-47-4)
  Hydrogenated Coconut Acid (CAS No. 68938-15-8)
Coix Lacryma-Jobi (Job's Tears) Seed Oil
Corylus Americana (Hazel) Seed Oil
  Hydrogenated Hazelnut Oil
Corylus Avellana (Hazel) Seed Oil
Crambe Abyssinica Seed Oil [Abyssinian Mustard]
Cucumis Sativus (Cucumber) Seed Oil (CAS No. 70955-25-8)
Cucurbita Pepo (Pumpkin) Seed Oil (CAS No. 8016-49-7)
  Hydrogenated Pumpkin Seed Oil
Cynara Cardunculus Seed Oil [Artichoke] (CAS No. 923029-60-1)
Elaeis Guineensis (Palm) Oil (CAS No. 8002-75-3)
  Elaeis Guineensis (Palm) Kernel Oil (CAS No. 8023-79-8)
  Hydrogenated Palm Kernel Oil (CAS No. 68990-82-9; 84540-04-5)
  Elaeis (Palm) Fruit Oil
  Hydrogenated Palm Oil (CAS No. 8033-29-2; 68514-74-9)
  Elaeis Guineensis (Palm) Butter (CAS No. 8002-75-3)
  Palm Kernel Acid
  Potassium Palm Kernelate
  Potassium Palmate
  Potassium Hydrogenated Palmate
  Sodium Palm Kernelate (CAS No. 61789-89-7)
  Sodium Palmate (CAS No. 61790-79-2)
  Sodium Hydrogenated Palmate
  Palm Acid
  Hydrogenated Palm Acid
Elaeis Oleifera Kernel Oil
Euterpe Oleracea Fruit Oil [Acai]
Fragaria Ananassa (Strawberry) Seed Oil
Fragaria Chiloensis (Strawberry) Seed Oil
Fragaria Vesca (Strawberry) Seed Oil
Fragaria Virginiana (Strawberry) Seed Oil
Garcinia Indica Seed Butter [Kokum]
Gevuina Avellana Oil [Chilean Hazel]
  Gevuina Avellana Seed Oil
Glycine Soja (Soybean) Oil (CAS No. 8001-22-7)
  Glycine Soja (Soybean) Oil Unsaponifiables (CAS No. 91770-67-1)
  Hydrogenated Soybean Oil (CAS No. 8016-70-4)
  Soy Acid (CAS No. 68308-53-2)
  Potassium Soyate
  Sodium Soyate
Gossypium Herbaceum (Cotton) Seed Oil (CAS No. 8001-29-4)
  Hydrogenated Cottonseed Oil (CAS No. 68334-00-9)
  Cottonseed Acid (CAS No. 68308-51-0)
Guizotia Abyssinica Seed Oil [Ramtil/Niger]
Helianthus Annuus (Sunflower) Seed Oil (CAS No. 8001-21-6)
  Helianthus Annuus (Sunflower) Seed Oil Unsaponifiables
  Hydrogenated Sunflower Seed Oil
  Sunflower Seed Acid (CAS No. 84625-38-7)
Hippophae Rhamnoides Oil [Sea-Buckthorn]
  Hippophae Rhamnoides Fruit Oil [Sea-Buckthorn]
  Hippophae Rhamnoides Seed Oil [Sea-Buckthorn]
Irvingia Gabonensis Kernel Butter [Dika] (CAS No. 192230-28-7)
  Linseed Acid (CAS No. 68424-45-3)
Luffa Cylindrica Seed Oil [Luffa]
Lupinus Albus Seed Oil [White Lupine]
  Lupinus Albus Oil Unsaponifiables

Table 1. Plant-derived Fatty Acid Oils

Lycium Barbarum Seed Oil [Goji Berry]
Macadamia Integrifolia Seed Oil
  Hydrogenated Macadamia Seed Oil
Macadamia Ternifolia Seed Oil (CAS No. 128497-20-1 or 129811-19-4)
  Sodium Macadamiaseedate
Mangifera Indica (Mango) Seed Oil
  Mangifera Indica (Mango) Seed Butter
  Sodium Mangoseedate
Morinda Citrifolia Seed Oil [Noni]
Moringa Oleifera Seed Oil [Ben/Moringa]
  Moringa Pterygosperma Seed Oil
Oenothera Biennis (Evening Primrose) Oil
  Hydrogenated Evening Primrose Oil
Olea Europaea (Olive) Fruit Oil (CAS No. 8001-25-0)
  Olea Europaea (Olive) Oil Unsaponifiables (CAS No. 156798-12-8)
  Hydrogenated Olive Oil
  Hydrogenated Olive Oil Unsaponifiables
  Potassium Olivate (CAS No. 68154-77-8)
  Sodium Olivate (CAS No. 64789-88-6)
  Olea Europaea (Olive) Husk Oil
  Olive Acid (CAS No. 92044-96-7)
Orbignya Cohune Seed Oil [Cohune]
Orbignya Oleifera Seed Oil [Babassu] (CAS No. 91078-92-1)
  Potassium Babassuate
  Sodium Babassuate
  Babassu Acid
Orbignya Speciosa Kernel Oil
Oryza Sativa (Rice) Bran Oil (CAS No. 68553-81-1; 84696-37-7)
  Hydrogenated Rice Bran Oil
  Oryza Sativa (Rice) Germ Oil
  Oryza Sativa (Rice) Seed Oil
  Rice Bran Acid (CAS No. 93165-33-4)
Passiflora Edulis Seed Oil [Passion Fruit] (CAS No. 87676-26-1)
  Hydrogenated Passiflora Edulis Seed Oil
Perilla Ocymoides Seed Oil [Perilla]
Persea Gratissima (Avocado) Oil (CAS No. 8024-32-6)
  Persea Gratissima (Avocado) Oil Unsaponifiables (CAS No. 91770-40-0)
  Hydrogenated Avocado Oil
  Persea Gratissima (Avocado) Butter
  Sodium Avocadoate
Pistacia Vera Seed Oil [Pistachio] (CAS No. 90082-81-8; 129871-01-8)
  Hydrogenated Pistachio Seed Oil
Plukenetia Volubilis Seed Oil [Sacha Inchi]
Prunus Amygdalus Dulcis (Sweet Almond) Oil
  (CAS No. 8007-69-0; 90320-37-9)
  Prunus Amygdalus Dulcis (Sweet Almond) Oil Unsaponifiables
  Hydrogenated Sweet Almond Oil
  Hydrogenated Sweet Almond Oil Unsaponifiables
  Sodium Sweet Almondate
Prunus Armeniaca (Apricot) Kernel Oil (CAS No. 72869-69-3)
  Prunus Armeniaca (Apricot) Kernel Oil Unsaponifiables
  Hydrogenated Apricot Kernel Oil
  Hydrogenated Apricot Kernel Oil Unsaponifiables
Prunus Avium (Sweet Cherry) Seed Oil
Prunus Domestica Seed Oil [Prune/Plum]
Prunus Persica (Peach) Kernel Oil (CAS No. 8002-78-6; 8023-98-1)
  Hydrogenated Peach Kernel Oil
Punica Granatum Seed Oil [Pomegranate]
  Hydrogenated Punica Granatum Seed Oil
Pyrus Malus (Apple) Seed Oil
Ribes Nigrum (Black Currant) Seed Oil (CAS No. 97676-19-2)
  Hydrogenated Black Currant Seed Oil
Ribes Rubrum (Currant) Seed Oil
Rosa Canina Fruit Oil [Dog Rose]
  Hydrogenated Rosa Canina Fruit Oil
Rubus Chamaemorus Seed Oil [Cloudberry]
Rubus Idaeus (Raspberry) Seed Oil
  Hydrogenated Raspberry Seed Oil
Schinziophyton Rautanenii Kernel Oil [Mongongo]
Sclerocarya Birrea Seed Oil [Marula]
Sesamum Indicum (Sesame) Seed Oil (CAS No. 8008-74-0)
  Sesamum Indicum (Sesame) Oil Unsaponifiables
  Hydrogenated Sesame Seed Oil
  Sesamum Indicum (Sesame) Seed Butter
  Sodium Sesameseedate
Silybum Marianum Seed Oil [Thistle]
Solanum Lycopersicum (Tomato) Fruit Oil
  Solanum Lycopersicum (Tomato) Seed Oil
Theobroma Cacao (Cocoa) Seed Butter (CAS No. 8002-31-1)
  Sodium Cocoa Butterate
Theobroma Grandiflorum Seed Butter [Cupuacu] (CAS No. 394236-97-6)
  Sodium Theobroma Grandiflorum Seedate
Torreya Nucifera Seed Oil [Kaya]
Triticum Vulgare (Wheat) Germ Oil (CAS No. 8006-95-9; 68917-73-7)
  Triticum Aestivum (Wheat) Germ Oil
  Triticum Vulgare (Wheat) Germ Oil Unsaponifiables
  Hydrogenated Wheat Germ Oil Unsaponifiables
  Hydrogenated Wheat Germ Oil
  Wheat Germ Acid (CAS No. 68938-32-9)
Vaccinium Corymbosum (Blueberry) Seed Oil
Vaccinium Macrocarpon (Cranberry) Seed Oil
  Hydrogenated Cranberry Seed Oil
Vaccinium Myrtillus Seed Oil [Bilberry] (CAS No. 1161921-09-0)
Vaccinium Vitis-Idaea Seed Oil [Ligonberry],
Vegetable (Olus) Oil
  Hydrogenated Vegetable Oil
Vitis Vinifera (Grape) Seed Oil (CAS No. 8024-22-4)
  Hydrogenated Grapeseed Oil
  Sodium Grapeseedate
Zea Mays (Corn) Oil (CAS No. 8001-30-7)
  Zea Mays (Corn) Oil Unsaponifiables
  Zea Mays (Corn) Germ Oil
  Potassium Cornate (CAS No. 61789-23-9)
  Corn Acid (CAS No. 68308-50-9)

[a] Previously reviewed ingredients are in ***bold and italics***.

Table 2. Previously reviewed oil and fatty acid ingredients.

Ingredients	Publication Date	Conclusion
Oil Ingredients		
Arachis Hypogaea (Peanut) Oil (CAS No. 8002-03-7) Hydrogenated Peanut Oil (CAS No. 68425-36-5) Peanut Acid (CAS No. 91051-35-3)	IJT 20(S2):65-77, 2001	Safe
Carthamus Tinctorius (Safflower) Seed Oil (CAS No. 8001-23-8)	JACT 4(5):171-197, 1985; Re-reviewed, not reopened IJT 25(2):1-89, 2006	Safe
Cocos Nucifera (Coconut) Oil (CAS No. 8001-31-8) Coconut Acid (CAS No. 61788-47-4) Hydrogenated Coconut Acid (CAS No. 68938-15-8) Hydrogenated Coconut Oil (CAS No. 84836-98-6) Magnesium Cocoate Potassium Cocoate (CAS No. 61789-30-8) Potassium Hydrogenated Cocoate Sodium Cocoate (CAS No. 61789-31-9) Sodium Hydrogenated Cocoate	JACT 5(3):103-121, 1986; CIR Final Report, 2008	Safe
Corylus Americana (Hazel) Seed Oil Corylus Avellana (Hazel) Seed Oil	IJT 20 (S1):15-20, 2001	Insufficient data
Elaeis Guineensis (Palm) Oil (CAS No. 8002-75-3) Elaeis Guineensis (Palm) Kernel Oil (CAS No. 8023-79-8) Hydrogenated Palm Oil (CAS No. 8033-29-2; 68514-74-9) Hydrogenated Palm Kernel Oil (CAS No. 68990-82-9; 84540-04-5)	IJT 19(S2):7-28, 2000	Safe
Gossypium Herbaceum (Cotton) Seed Oil (CAS No. 8001-29-4) Cottonseed Acid (CAS No. 68308-51-0) Hydrogenated Cottonseed Oil (CAS No. 68334-00-9)	IJT 20(S2):21-29, 2001	Safe
Oryza Sativa (Rice) Bran Oil (CAS No. 68553-81-1; 84696-37-7) Oryza Sativa (Rice) Germ Oil Rice Bran Acid (CAS No. 93165-33-4)	IJT 25(S2):91-120, 2006	Safe
Prunus Amygdalus Dulcis (Sweet Almond) Oil (CAS No. 8007-69-0)	JACT 2(5):85-99, 1983; Re-reviewed, not reopened IJT 24 (S1):1-102, 2005	Safe
Sesamum Indicum (Sesame) Seed Oil (CAS No. 8008-74-0) Hydrogenated Sesame Seed Oil Sesamum Indicum (Sesame) Oil Unsaponifiables Sodium Sesameseedate	JACT 12(3):261-277, 1993; Amended Final Report, 2009	Safe
Zea Mays (Corn) Oil (CAS No. 8001-30-7) Zea Mays (Corn) Germ Oil Zea Mays (Corn) Oil Unsaponifiables Corn Acid (CAS No. 68308-50-9) Potassium Cornate (CAS No. 61789-23-9)	Final Report, 2008	Safe
Persea Gratissima (Avocado) Oil (CAS No. 8024-32-6)	JEPT 4(4):93-103, 1980; Re-reviewed, not reopened IJT 22(1):1-35, 2003	Safe
Triticum Vulgare (Wheat) Germ Oil (CAS No. 8006-95-9; 68917-73-7)	JEPT 4(4):33-45, 1980; Re-reviewed, not reopened IJT 22(1):1-35, 2003	Safe
Fatty Acids		
Arachidonic Acid (CAS No. 506-32-1)	JACT 12 (5):481-559, 1993	Insufficient data
Hydroxystearic Acid (CAS No. 106-14-9)	IJT 18(S1):1-10, 1999	Safe
Lauric Acid (CAS No. 143-07-7) Myristic Acid (CAS No. 544-63-8) Oleic Acid (CAS No. 112-80-1) Palmitic Acid (CAS No. 57-10-3) Stearic Acid (CAS No. 57-11-4)	JACT 6(3):321-401, 1987; Re-reviewed, not reopened IJT 25(2):1-89, 2006	Safe

Table 2. Previously reviewed oil and fatty acid ingredients.

Ingredients	Publication Date	Conclusion
Glyceryl Triesters		
Trilaurin		
Triarachidin		
Tribehenin		
Tricaprin		
Tricaprylin		
Trierucin		
Triheptanoin		
Triheptylundecanoin		
Triisononanoin		
Triisopalmitin		
Triisostearin		
Trilinolein	IJT 20 (S4):61-94, 2001	Safe
Trimyristin		
Trioctanoin		
Triolein		
Tripalmitin		
Tripalmitolein		
Triricinolein		
Tristearin		
Triundecanoin		
Glyceryl Triacetyl Hydroxystearate		
Glyceryl Triacetyl Ricinoleate		
Glyceryl Stearate Diacetate		

Table 3. Chemical properties for plant-derived fatty acid oils.

Properties and Constituents [a]	Actinidia Chinensis (Kiwi) Seed Oil[68]	Adansonia Digitata Oil[69,70]	Aleurites Moluccana Seed Oil [Kukui][71-74]	Anacardium Occidentale (Cashew) Seed Oil[75]	Arachis Hypogaea (Peanut) Oil[6,71,76-79]	Argania Spinosa Kernel Oil[80,81]	Astrocaryum Murumuru Seed Butter[6,82]
Appearance		Pale yellow	Clear yellow liquid		Light yellow	Yellow	Pale brown waxy solid at room temperature
Specific gravity			0.920-0.930 (20◦C)		0.912-0.920 (20◦C)	0.908-0.918 (20◦C)	0.890-0.910 (25◦C)
Refractive index			1.470-1.480 (20◦C)		1.46-1.475 (20◦C)		
Iodine value		65-95	130-175		74-107	95	15 max
Saponification value		190-210	185-210		180-208		270-350
Peroxide value (meq/kg)	44.37	5.0-10	5.0 max	0.22	0.39, 5.0 max	10.0 max	20.0 max
Melting point (◦C)							25-37
Unsaponifiable matter (%)			0.3 - 1		≤1.0		
Free fatty acids (%)	1.2	2.0 max as oleic acid	0.1-4		0.2-2.08		12.56 as oleic acid
Titer (◦C)					26-32		
Acid value					0.5	3-4	

Properties and Constituents	Avena Sativa (Oat) Kernel Oil[83]	Bertholletia Excelsa Seed Oil[75,84]	Borago Officinalis Seed Oil[85,86]	Brassica Campestris (Rapeseed) Seed Oil[6]	Hydrogenated Rapeseed Oil[7]	Rapeseed Acid[87]	Canola Oil[7]
Appearance	Yellow		Clear, pale yellow-golden		White waxy solid		Light yellow oil
Specific gravity	0.914-0.932 (25◦C)	1.473	0.918-0.928 (20◦C)				
Refractive index	1.469-1.471 (25◦C)	0.914 (20◦C)	1.474-1.479 (20◦C)				1.465-1.467 (40°C)
Iodine value		74.2	130-155	81-112	4 max	119-120 g/100 g	110-126
Saponification value	176-186	192.4	184-194	168-192			
Peroxide value (meq/kg)	0.6-1.1	0.16	10.0 max		2.0 max		10 max
Melting point (◦C)							
Unsaponifiable matter (%)	3.7-4.3			0.5 - 2			1.5 max
Free fatty acids (%)	0.1-0.3			1	2.0 max as oleic acid		0.1% max as oleic acid
Titer (◦C)							
Acid value			1.0 max			197-200 mg KOH/g	

[a]Shading identifies previously reviewed ingredients, with gray shading for ingredients with safe and red shading for ingredients with insufficient data conclusions.

Table 3. Chemical properties for plant-derived fatty acid oils (continued).

Properties and Constituents [a]	Brassica Oleracea Acephala Seed Oil[88]	Brassica Oleracea Italica (Broccoli) Seed Oil[89]	Butyrospermum Parkii (Shea) Butter[6,71,90-93]	Butyrospermum Parkii (Shea) Oil[7]	Camellia Oleifera Seed Oil[94,95]	Canarium Indicum Oil[96,97]	Carica Papaya Seed Oil[98,99]
Appearance	Yellow	Golden	Grey, tallow-like	Pale yellow	Clear, pale yellow or "water white"	Cream to golden	Pale yellow
Specific gravity	0.9010 (20◦C)	0.910-0.918 (20◦C)	0.918 (15◦C)				
Refractive index	1.4741 (23◦C)	1.465-1.475 (20◦C)	1.468 (25◦C)			1.45-1.47	
Iodine value	61.2	90-120	45-77	28 - 43	80-94		65-100
Saponification value	123.06		165-190	185-195	188-196		
Peroxide value (meq/kg)			5.0 max	≤ 10	10.0 max	≤ 20	10.0 max
Melting point (◦C)			32-46; 28-42 (slip)				
Unsaponifiable matter (%)	1.6		3-13	≤ 1.5	1.5 max	≤ 1	
Free fatty acids (%)			1.0 max as oleic acid	≤ 0.1 as oleic acid		0.2	0.8-3
Titer (◦C)			49-54				
Acid value	2.1	1.5	1.5		1.0 max	≤ 10	

Properties and Constituents	Carthamus Tinctorius (Safflower) Seed Oil[7]	Carya Illinoensis (Pecan) Seed Oil[71,75,84]	Caryocar Brasiliense Fruit Oil [Pequi][87,100]	Citrullus Lanatus (Watermelon) Seed Oil[6,101]	Citrus Aurantifolia (Lime) Seed Oil[102,103]	Citrus Aurantium Dulcis (Orange) Seed Oil[104,105]	Citrus Paradisi (Grapefruit) Seed Oil[106,107]
Appearance	Light yellow oil		Yellow[100]	Pale to golden yellow liquid	Clear yellow	Clear, light yellow	Clear yellow
Specific gravity		0.924 (25◦C)		0.8930-0.9166		0.910-0.920 (20◦C)	
Refractive index		1.472		1.4668		1.466-1.475 (20◦C)	
Iodine value	135-150	100 - 105	48.65-74.80[100] 50-70 g/100 g[87]	113-123		90-110	80-125
Saponification value		190	160.15-202[100] 190-210 mg KOH/g	193-195		185-200	
Peroxide value (meq/kg)	10 max	0.15	0.99-5.22[100] ≤20[87]	≤ 5.0	5.0 max	5-10	5-10
Melting point (◦C)							
Unsaponifiable matter (%)	1.5 max	0.35-40					
Free fatty acids (%)	0.1 max as oleic acid		0.98-2.85 (mg KOH/g)[100]	< 5.0 as oleic acid		0.5 as oleic acid	
Titer (◦C)							
Acid value			10 mg KOH/g max[87]		1.0 max	0.8 max	1.0 max

Table 3. Chemical properties for plant-derived fatty acid oils (continued).

Properties and Constituents [a]	Cocos Nucifera (Coconut) Oil[6,7,108]	Cucurbita Pepo (Pumpkin) Seed Oil[109,110]	Elaeis Guineensis (Palm) Oil[6,7]	Elaeis Guineensis (Palm) Kernel Oil[6,7]	Fragaria Ananassa (Strawberry) Seed Oil[6,111,112]	Garcinia Indica Seed Butter [Kokum][113-115]	Glycine Soja (Soybean) Oil[6,7]
Appearance	White to light yellow-tan	Dark green	Pale yellow to deep orange in color	Nearly colorless	Light golden/yellow to yellow		Light amber oil
Specific gravity	0.917 - 0.919 (25◦/15.5◦C)		0.921-0.925 (40◦C)		0.93-0.95		
Refractive index	1.448 - 1.450 (40◦C)		1.453-1.458 (40◦C)			1.4565-1.4575 (40◦C)	
Iodine value	6-11	110-330	44-58	14-33		30-50	120.9-151.4
Saponification value	248-265	174-197	195-205	245-255		185-195	
Peroxide value (meq/kg)	≤ 10	5.0 max	10 max	10 max	< 15		10 max
Melting point (◦C)	22 - 26		25-50	25-30		37-43; 27 (slip)	
Unsaponifiable matter (%)	≤ 0.5	1.5	0.2-0.8	1.5 max		1.5 max; 18-20; 32-40	0.3-0.6
Free fatty acids (%)	≤ 0.1% as oleic acid; ≤ 0.07% as lauric acid	1.5 as oleic acid	0.1 max as oleic acid; 0.09 as palmitic acid	0.1 max as oleic acid; 0.07 max as lauric acid		0.1-1	0.05-0.7
Titer (◦C)	20 - 24						
Acid value					18 max		

Properties and Constituents	Gossypium Herbaceum (Cotton) Seed Oil[6,7]	Guizotia Abyssinica Seed Oil[6]	Hazel Seed Oil*[76,116-118]	Helianthus Annuus (Sunflower) Seed Oil[6,7]	Sunflower Seed Acid[87]	Hippophae Rhamnoides Fruit Oil[119]	Hippophae Rhamnoides Seed Oil[120-122]
Appearance	Dark red-brown oil	Pale yellow with a bluish tint		Light amber oil		Orange-red	Orange
Specific gravity		0.910-0.928	0.912-0.917 (15.5◦C); 0.905-0.925 (20◦C)	0.894-0.899 (60◦C)		0.90	0.890-0.955 (20◦C)
Refractive index		1.467-1.471	1.467-1.474 (20◦C)	1.4597-1.4745 (25◦C)			1.4650-1.4825 (20◦C)
Iodine value	90-113	126-139	83-100	128-144	125-140 g/100 g		130-200
Saponification value	180-198	180-195	180-200	188-194			184-210
Peroxide value (meq/kg)	10 max		0.43; 10.0 max	10 max		10 max	5-10 max
Melting point (◦C)				0			
Unsaponifiable matter (%)	1.5 max	0.5-1	≤ 1.0	0.3-0.5			1.0
Free fatty acids (%)	0.1 max as oleic acid	0.4-3	0.2 max as oleic acid	0.1 max as oleic acid			2.0 max; 18 max
Titer (◦C)							
Acid value			≤ 0.5		125-140 mg KOH/g	18 max	15

*Information mainly on Corylus Avellena.

Table 3. Chemical properties for plant-derived fatty acid oils (continued).

Properties and Constituents [a]	Irvingia Gabonenesis Kernel Butter[123]	Juglans Regia (Walnut) Seed Oil[71,76,84]	Linum Usitatissimum (Linseed) Seed Oil[6]	Macadamia Nut Oil[76,84,124-126]	Mangifera Indica (Mango) Seed Oil[6]	Moringa Oleifera Seed Oil[127-129]	Oenothera Biennis (Evening Primrose) Oil[130,131]
Appearance				Pale to golden yellow	Pale yellow to ivory cream color		Light yellow
Specific gravity		0.917 (25◦C)	0.927-0.931 (20◦C)	0.911-0.918 (20◦C)	0.91	0.908 (20◦C); 0.8933 (24◦C)	0.920-0.930 (20◦C)
Refractive index		1.475 (25◦C)	1.4786-1.4815	1.466-1.470 (20◦C)	1.456	1.4566 (40◦C)	1.475-1.480 (20◦C)
Iodine value		150 - 162	170-204	62-82	32-93	66.47	145-165
Saponification value		190 - 197	189-196	190-200	190-195	164.27; 192	180-195
Peroxide value (meq/kg)		0.37		0.36; 10.0 max		0.45; 10.0	10.0 max
Melting point (◦C)			0		34-43	18.93	
Unsaponifiable matter (%)	0.13	0.5	0.5-1.5	1.5	0.8-2.9	0.58	
Free fatty acids (%)	0.30	0.2 - 2.5	5	0.5 max; 1.0 max as oleic acid		2.55 as oleic acid	
Titer (◦C)							
Acid value				1			1-2

Properties and Constituents	Olea Europaea (Olive) Fruit Oil[6]	Olea Europaea(Olive) Husk Oil[132]	Olive Acid[87]	Oryza Sativa (Rice) Bran Oil[133,134]	Oryza Sativa (Rice) Bran Oil[133,134]	Passiflora Edulis Seed Oil [Passion Fruit]	Persea Gratissima (Avocado) Oil[6]
Appearance	Almost colorless to yellow, greenish, or brown in color			Light golden yellow	Light golden yellow	Golden-orange	
Specific gravity	0.914-0.918			0.916-0.922 (15.5◦C)	0.916-0.922 (15.5◦C)	0.917 (20◦C)	0.910-0.916
Refractive index	1.469-1.484			1.470-1.473 (20◦C)	1.470-1.473 (20◦C)	1.468-1.473 (20◦C)	1.461-1.465
Iodine value	64-88; refined 75-94		85-91 g/100 g	92-115	92-115	119.9-129.29[135]	71-95
Saponification value	185-212; refined 184-186			180-195	180-195	176-187.4	177-198
Peroxide value (meq/kg)	20 max (refined)	14.33		10.0 max	10.0 max	1.37-2.23	
Melting point (◦C)							
Unsaponifiable matter (%)	0.6-1.2; 1.5 max refined					0.9-2.86	
Free fatty acids (%)	0.6-1.4; 0.3 max refined			1.0 as oleic acid	1.0 as oleic acid		
Titer (◦C)							
Acid value			190-201 mg KOG/g			2.11-2.36	

Table 3. Chemical properties for plant-derived fatty acid oils (continued).

Properties and Constituents [a]	Pistacia Vera Seed Oil [75]	Plukenetia Volubilis Seed Oil[136]	Prunus Amygdalus (Sweet Almond) Oil[6,71,76,137-139]	Prunus Armeniaca (Apricot) Kernel Oil	Prunus Avium (Sweet Cherry) Seed Oil[140,141]	Prunus Domestica Seed Oil[142,143]
Appearance		Yellow-amber	Colorless to pale yellow liquid		Clear light yellow	
Specific gravity		0.90-0.93 (20◦C)	0.911-0.920 (20◦C)	0.923[6]	0.905-0.925 (20◦C)	
Refractive index		1.478-1.481 (20◦C)	1.467-1.473 (20◦C)	1.4672-1.4722[6]	1.463-1.480 (20◦C)	
Iodine value		180-200	93 - 106	81-123[6]	90-115	90-108
Saponification value		180-210	183 - 197	191[6]	105-135	
Peroxide value (meq/kg)	0.22	0-15	0.19		10.0 max	10.0 max
Melting point (◦C)						
Unsaponifiable matter (%)			0.4-1.0	0.4-1.4		
Free fatty acids (%)			1.0 max		0.5% max	2.0 max as oleic acid
Titer (◦C)				0-6[144]		
Acid value		0-2	0.5		1.0 max	

Properties and Constituents	Prunus Persica (Peach) Kernel Oil[6,145]	Punica Granatum Seed Oil[146,147]	Pyrus Malus (Apple) Seed Oil[148]	Ribes Nigrum (Black Currant) Seed Oil[149-151]	Ribes Rubrum (Currant) Seed Oil[152]	Rubus Chamaemorus Seed Oil[153]
Appearance	Pale yellow (refined)	Golden to dark yellow		Pale yellow or slightly greenish	Pale yellow or slightly greenish	Yellow-red
Specific gravity	0.910-0.920 (20◦C) refined	0.935 (15.5◦C)	0.902-0.903 (25◦C)	0.92	0.92	0.92
Refractive index			1.465-1.466 (40◦C)			
Iodine value	90-115 (refined)	190-230	94.14-101.15	145-185		
Saponification value			179.01-197.25			
Peroxide value (meq/kg)	5.0 max (refined)	10.0 max	2.43-2.52	1-10	10 max	10 max
Melting point (◦C)						
Unsaponifiable matter (%)						
Free fatty acids (%)		1.4; 5.0 max as oleic acid		0.2		
Titer (◦C)						
Acid value			4.036-4.323	3; 18 max	18 max	18 max

Table 3. Chemical properties for plant-derived fatty acid oils (continued).

Properties and Constituents [a]	Rubus Idaeus (Raspberry) Seed Oil[154-156]	Schinziophyton Rautanenii Kernel Oil[157]	Sclerocarya Birrea Seed Oil [Marula][158]	Solanum Lycopersicum (Tomato) Seed Oil[159]	Theobroma Cacao (Cocoa) Seed Butter[6]	Vaccinium Corymbosum (Blueberry) Seed Oil[68,160,161]
Appearance	Yellow or yellow-red	Light yellow		Clear golden yellow to darker red		Green with yellow tint or dark green /brown
Specific gravity	0.92			0.9135-0.9357	0.950-0.998	
Refractive index		1.4830	1.46	1.4577-1.4771	1.453-1.458	
Iodine value	175-195		100.25	105-130.5	35-40	155-175
Saponification value	180-200		162.70	156-194.9	190-200	
Peroxide value (meq/kg)	5.0 max; 10 max	10 mg/kg	4.58			20-24.62
Melting point (◦C)			26-28		33.5	
Unsaponifiable matter (%)			3.06			
Free fatty acids (%)	1.5 max as oleic acid					0.67; 2.0 as oleic acid
Titer (◦C)						
Acid value	18 max		33.70			

Properties and Constituents	Vaccinium Macrocarpon (Cranberry) Seed Oil[6,68,162-165]	Vaccinium Myrtillus Seed Oil[166]	Vaccinium Vitis-Idaea Seed Oil[167]	Vitis Vinifera (Grape) Seed Oil[6]	Zea Mays (Corn) Oil[168,169]	
Appearance	Pale yellow to greenish; light green	Pale yellow to greenish	Pale yellow		Clear, bright golden yellow	
Specific gravity	0.923	0.93	0.92	0.91-0.93	0.920-0.928 (15.5◦C)	
Refractive index				1.470-1.476	1.472-1.476 (20◦C)	
Iodine value	140-180			125-143	103-128	
Saponification value	170-200			176-206	185-195	
Peroxide value (meq/kg)	< 15; 10 max	10 max	10 max		10.0 max	
Melting point (◦C)						
Unsaponifiable matter (%)						
Free fatty acids (%)	0.7; 1.0 as oleic acid					
Titer (◦C)						
Acid value	2.0 max; 18 max	18 max	18 max		0.2 max	

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%).

Fatty Acids [a]	Actinidia Chinensis (Kiwi) Seed Oil[68]	Adansonia Digitata Oil [Baobab] [69,70]	Aleurites Moluccana Seed Oil [Kukui][71,73,74]	Amaranthus Hypochondriacus Seed Oil [Amaranth][170]	Anacardium Occidentale (Cashew) Seed Oil[75]	Arachis Hypogaea (Peanut) Oil[6,77,78]	Arctium Lappa Seed Oil[171]	Argania Spinosa Kernel Oil [Argan][80,81]	Astrocaryum Murumuru Seed Butter [Murumuru][82]	Avena Sativa (Oat) Kernel Oil[83,172]
Caproic (C6)										
Caprylic (C8)									1.85	
Capric (C10)									1.85	
Lauric (C12)*	0.02								47.46	
Myristic (C14)	0.03				0.07		0.01		26	0.2-0.3
Myristoleic (C14:1)										
Palmitic (C16)	5.96	18-30	5-8	19 - 20	9.9	5-16	7.27	10-15	6.28	13.9-18.82
Palmitoleic (C16:1)		1	0.5		0.4		0.01			0.1-0.4
Heptadecanoic (C17:0)					0.1					
Stearic (C18)	3.09	2-8	0.1-6.7	3	8.7	1-6.5	32.56	5-6.5	2.65	0.8-2.79
Oleic (C18:1)	14.6	30-40	10-35	22 - 26	57.2	33.3-76	50.21	45-55	12.56	31.4-51.26
Linoleic (C18:2)	17.55	24-34	35-50	46 - 50	20.8	8-47.5	3.18	28-36	2.87	22.8-43.1
Linolenic (C18:3)	57.4	1-3	24-40		0.2	0-0.6				0.64-2.1
Arachidic (C20)	0.34		1.5		1	0.17-3	0.22			
Eicosenic (C20:1)			1		0.3	0.33-3	0.33			0.5-1
Eicosadienoic (C20:2)										
Arachidonic (C20:4)										
Behenic (C22)					0.4	1-5				
Erucic (C22:1)					0.3	0.5				
Docosadienoic (C22:2)										
Docosahexaenoic (C22:6)										
Lignoceric (C24)						0.2-3	0.49			
Others						<C16:0 = 0.4	heptadecenoic=0.02; nonadecadienoic acid=2.99; heneicosanoic acid =1.07; dicosanoic acid=0.43			Arachidic (C20) + Eicosadienoic (C20:2)=0.1-0.3; C18:1, n-11=0.9-1.3

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued).

Fatty Acids [a]	Bassia Butyracea Seed Butter[h113]	Bassia Latifolia Seed Butter [Mahwa][e,113]	Bertholletia Excelsa Seed Oil [Brazil][75]	Borago Officinalis Seed Oil [Borage] [85,86]	Brassica Campestris (Rapeseed) Seed Oil[6]	Rapeseed Acid[87]	Brassica Napus Seed Oil [Rapeseed][173]	Hydrogenated Rapeseed Oil[7]	Canola Oil[7]
Caproic (C6)									
Caprylic (C8)									
Capric (C10)									
Lauric (C12)									
Myristic (C14)			0.06			≤0.5		< 1.0	<0.2
Myristoleic (C14:1)									
Palmitic (C16)	60.8	23.7-24.7	13.5	9-13	1.5 - 3	≤8	2	3-5.0	<6.0
Palmitoleic (C16:1)			0.3			≤2			<1.0
Heptadecanoic (C17:0)			0.2						
Stearic (C18)	3.2	19.3-29.9	11.8	3-5	0.7 - 1.3	≤3	1	38-42	<2.5
Oleic (C18:1)	30.9	36.3-43.3	29.1	10-22	12.1 - 57.4	54-70	21	1	>50
Linoleic (C18:2)	4.9	11.6-15.8	42.8	33-46	11.4 - 22.1	18-24	20	< 1.0	<40.0
Linolenic (C18:3)			0.2	18-25	8.3 - 12.5	5-10	2		<14
Arachidic (C20)			0.5			≤6	1	8-10.0	<1.0
Eicosenoic (C20:1)			0.2	2-6	5.6 - 3.1			< 1.0	<2.0
Eicosadienoic (C20:2)									
Arachidonic (C20:4)									
Behenic (C22)			0.1					42-50	<0.5
Erucic (C22:1)			0.3	1-3.5	1 - 58.6		53	< 1.0	<2.0
Docosadienoic (C22:2)									
Docosahexaenoic (C22:6)									
Lignoceric (C24)							2	1-2.0	<0.2
Others				α-Linolenic (C18:3) = 0.4%; γ-Linolenic = 1-3.5%		<C14 = ≤0.5; >C18:3 = ≤5; >C20 = ≤6			<C14 = <0.1; C24:1 = <0.2

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued).

Fatty Acids [a]	Brassica Oleracea Acephala Seed Oil [Kale][88]	Brassica Oleracea Italica (Broccoli) Seed Oil[89]	Butyrospermum Parkii (Shea) Oil[7]	Butyrospermum Parkii (Shea) Butter[6,90-92]	Camelina Sativa Seed Oil [False Flax][174]	Camellia Japonica Seed Oil[175]	Camellia Kissi Seed Oil[175]	Camellia Oleifera Seed Oil [Tea Seed][94,95]	Camellia Sinensis Seed Oil[175]
Caproic (C6)									
Caprylic (C8)									
Capric (C10)									
Lauric (C12)									
Myristic (C14)				0.5					
Myristoleic (C14:1)									
Palmitic (C16)	4.4	0-5	3.8-4.1	3-9	7.8	7.9		6.1-15	8-10
Palmitoleic (C16:1)						0.16			
Heptadecanoic (C17:0)									
Stearic (C18)	0.7	0-5	41.2-56.8	30-50	2.96	2.46		0.8-2	1.5-3.5
Oleic (C18:1)	11.3	10-20	34.0-46.9	38-50	16.77	84.99	80	72-87	78-86
Linoleic (C18:2)	12.6	10-20	3.7-6.5	3-8	23.08	3.76		5.3-14.3	7-10
Linolenic (C18:3)	10.2	5-10		0.5 max	31.2				0.2-0.8
Arachidic (C20)	8.2		1-2	2.5-3		0.49			
Eicosenoic (C20:1)	0.4	5-10			11.99				
Eicosadienoic (C20:2)									
Arachidonic (C20:4)									
Behenic (C22)									
Erucic (C22:1)	51.8	40-50			2.8				
Docosadienoic (C22:2)									
Docosahexaenoic (C22:6)									
Lignoceric (C24)									
Others					3.4				

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued).

Fatty Acids [a]	Canarium Indicum Oil [Galip][96,97]	Carica Papaya Seed Oil [Papaya][98,99]	Carthamus Tinctorius (Safflower) Seed Oil[32,176]	Carya Illinoensis (Pecan) Seed Oil[71,75]	Caryocar Brasiliense Fruit Oil [Pequi][f,87,100]	Chenopodium Quinoa Seed Oil [Quinoa][177]	Citrullus Lanatus (Watermelon) Seed Oil[101]	Citrus Aurantifolia (Lime) Seed Oil[102,103]	Citrus Aurantium Dulcis (Orange) Seed Oil[104,105]
Caproic (C6)									
Caprylic (C8)									
Capric (C10)									
Lauric (C12)	≤ 2								
Myristic (C14)	≤ 2			Trace	0.5	0.2		1	
Myristoleic (C14:1)									
Palmitic (C16)	28-38	8-18	2	3-4.3	34.4-44.3	9.9 - 11	8.0 - 13.0	20-30	14-22
Palmitoleic (C16:1)	≤ 2	2		0.1	1.3	0.1	< 1.0		
Heptadecanoic (C17:0)	≤ 2			0.1					
Stearic (C18)	10-20	2-6		1.8-2	0.66-1.8	0.7 - 0.8	8.0 - 12.0	3-8	2-6
Oleic (C18:1)	30-40	60-77	26	40.6-79	54.55-57.4	22 – 50.2	15.0 - 30.0	20-38	26-35
Linoleic (C18:2)	12-22	3-25	68	16-50.3	0.84-2.8	1.2 – 56	55.0 - 65.0	30-45	35-45
Linolenic (C18:3)		0.8	Trace	0.7	0.18-1.0	0.7 – 7	< 1.0	5-15	2-6
Arachidic (C20)			Trace	Trace		0.7	< 1.0	2	0.5
Eicosenoic (C20:1)		2		1.2			< 1.0		
Eicosadienoic (C20:2)									
Arachidonic (C20:4)									
Behenic (C22)				0.2			< 1.0		
Erucic (C22:1)				0.3					
Docosadienoic (C22:2)									
Docosahexaenoic (C22:6)							< 2.0		
Lignoceric (C24)									
Others	Others = ≤ 2	α-Linolenic (C18:3) = 2%;					< 1.0		

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued).

Fatty Acids [a]	Citrus Grandis (Grapefruit) Seed Oil[106,107]	Citrus Limon (Lemon) Seed Oil[178]	Citrus Paradisi (Seed) Oil[179]	Cocos Nucifera (Coconut) Oil[33]	Coix Lacryma-Jobi (Job's Tears) Seed Oil[180]	Corylus Americana (Hazel) Seed Oil[173]	Corylus Avellana (Hazel) Seed Oil[12,116-118]	Crambe Abyssinica Seed Oil [Abyssinian Mustard][173,181]	Cucumis Sativus (Cucumber) Seed Oil[182]	Cucurbita Pepo (Pumpkin) Seed Oil[109,110]
Caproic (C6)				0-1						
Caprylic (C8)				5-9						
Capric (C10)				6-10				<0.01-0.11		
Lauric (C12)	1.5		2.95	44-52				<0.01-0.14		
Myristic (C14)	1		1.01	13-19			≤0.2	<0.01-0.43		
Myristoleic (C14:1)								<0.01-0.09		
Palmitic (C16)	18-30	18.8	36.25	8-11	16.0	6	4-9	0.81-5.55	9-13	10-16
Palmitoleic (C16:1)				0-1			0.2-1	<0.01-0.77		
Heptadecanoic (C17:0)		0.08					≤0.1			
Stearic (C18)	2-8	3.5	5.95	1-3	trace	3	1-6	0.6-10.42	6-9	3-7
Oleic (C18:1)	20-38	30.1	18.34	5-8	53	76	66-85	12.8-23.13	14-20	18-38
Linoleic (C18:2)	30-48	33.4	29.26	Trace-2.5	30.5	15	7-25	9.08-15.86	60-68	40-62
Linolenic (C18:3)	2-6	13.5	3.58		trace		≤0.6	3.27-9.43	<1	1
Arachidic (C20)		0.3	0.38				≤0.5	<0.01-1.19		
Eicosenoic (C20:1)		0.03	0.84				≤0.5	<0.01-6		
Eicosadienoic (C20:2)								<0.01-0.21		
Arachidonic (C20:4)								<0.01		
Behenic (C22)		0.08					≤0.3	<0.01-2.59		
Erucic (C22:1)							Trace-0.01	48.86-60		
Docosadienoic (C22:2)										
Docosahexaenoic (C22:6)								<0.01-1.34		
Lignoceric (C24)		0.2	C12:1=1.44				0.01	<0.01-1.85		
Others		C23:0 = <0.01; C26:0 = 0.01					C17:1 = ≤ 0.1	C20:3 = <0.01-0.19; C20:5 = <0.01-1.91		

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued).

Fatty Acids [a]	Cynara Cardunculus Seed Oil [Artichoke][183]	Elaeis Guineensis (Palm) Oil[26]	Elaeis Guineensis (Palm) Kernel Oil[26]	Elaeis Oleifera Kernel Oil[184]	Euterpe Oleracea Fruit Oil [Acai][185]	Fragaria Ananassa (Strawberry) Seed Oil[68,111,112]	Garcinia Indica Seed Butter [Kokum][g,123,186]	Gevuina Avellana Oil [Chilean Hazel][j,187]	Glycine Soja (Soybean) Oil[6]
Caproic (C6)			0.3	0.1					
Caprylic (C8)			4.4	0.9					
Capric (C10)			3.7	0.8					
Lauric (C12)		0.2	48.3	29.3					
Myristic (C14)		1.1	15.6	25.7		0.05			
Myristoleic (C14:1)									
Palmitic (C16)	12	44	7.8	10.1	22	4.32	2-8	1.9	
Palmitoleic (C16:1)		0.1			2			22.7	
Heptadecanoic (C17:0)									
Stearic (C18)	3	4.5	2	1.8	2	1.68	50-67.4	0.5	
Oleic (C18:1)	25	39.2	15.1	26.4	60	10-20	27-42	39.4	11.5 - 60.0
Linoleic (C18:2)	60	10.1	2.7	4.5	12	28.5 – 50	0.5-2	5.6	0000
Linolenic (C18:3)		0.4			Trace	25-40		0.1	2.9 - 12.1
Arachidic (C20)		0.4			2.5	0.71	0.7	1.4	
Eicosenoic (C20:1)								3.1	
Eicosadienoic (C20:2)									
Arachidonic (C20:4)									
Behenic (C22)								2.2	
Erucic (C22:1)									
Docosadienoic (C22:2)									
Docosahexaenoic (C22:6)									
Lignoceric (C24)								0.5	
Others			0.2	0.4		5.5 - 8.5		C18:1Δ12 = 6.2; C20:1Δ15 = 6.6; ; C22:1Δ17 = 7.9; ; C22:1Δ19 = 1.6	

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued).

Fatty Acids [a]	Gossypium Herbaceum (Cotton) Seed Oil[27]	Guizotia Abyssinica Seed Oil [Ramtil/Niger][6]	Helianthus Annuus (Sunflower) Seed Oil[6]	Sunflower Seed Acid[87]	Hippophae Rhamnoides Fruit Oil[i,119,188]	Hippophae Rhamnoides Seed Oil[121,122,188]	Irvingia Gabonenesis Kernel Butter[123,123]	Juglans Regia (Walnut) Seed Oil[189]	Limnanthes Alba (Meadowfoam) Seed Oil[6]
Caproic (C6)									
Caprylic (C8)									
Capric (C10)									
Lauric (C12)							35-51.1		
Myristic (C14)	2			≤2	0.4-0.6		36.8-58		
Myristoleic (C14:1)					0.2				
Palmitic (C16)	21	5.0-13	5.0 - 7.2	6-11	24-42	5-11.3	3.9-5	3-7	
Palmitoleic (C16:1)					24-42	4.4			
Heptadecanoic (C17:0)									
Stearic (C18)	Trace	2.0-11	2.0 - 6.5	3-7	0.9-2.1	2-5	0.4-0.7	0.5-3	
Oleic (C18:1)	30	6.0-40	14.7 - 37.2	19-31	3-30	11-30	0.6-2.7	9-30	
Linoleic (C18:2)	45	45-77	51.5 - 73.5	57-66		28-45	0.60	57-76	
Linolenic (C18:3)			Trace - 0.3	≤1	1.7-6.8	24.9-38	1.3	2-16	
Arachidic (C20)	Trace		0.3 - 1	≤3					
Eicosenoic (C20:1)									52 - 77
Eicosadienoic (C20:2)									
Arachidonic (C20:4)									
Behenic (C22)									
Erucic (C22:1)									8.0 - 29
Docosadienoic (C22:2)									7.0 - 20
Docosahexaenoic (C22:6)									
Lignoceric (C24)		2 max							
Others				>C20 = ≤3	Vakccenic C18:1(n-7) = 7.3-7.5; α-Linoleic C18:2 = 4.1-5.5	Vakccenic C18:1(n-7) = 3.2; α-Linoleic C18:2 = 34.1; Others = 3 max			

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued)[a]

Fatty Acids [a]	Linum Usitatissimum (Linseed) Seed Oil[6]	Luffa Cylindrica Seed Oil[190]	Lupinus Albus Seed Oil[191]	Lycium Barbarum Seed Oil[192]	Macadamia Integrifolia Seed Oil[b,2,124-126]	Mangifera Indica (Mango) Seed Oil[c,6]	Morinda Citrifolia Seed Oil[193]	Moringa Oleifera Seed Oil [Ben/Moringa][127,128,194]	Oenothera Biennis (Evening Primrose) Oil[130,131]	Olea Europaea (Olive) Oil[6]
Caproic (C6)										
Caprylic (C8)							1.44			
Capric (C10)										
Lauric (C12)					0.1-1.4					
Myristic (C14)		0.1			0.7-1.5			Trace		Trace
Myristoleic (C14:1)										
Palmitic (C16)	5.5	12.2	14.44-21.57		6-12	5-8	9.0	5-9.3	4-10	7.5 - 20
Palmitoleic (C16:1)		0.1	0.36-1.03		12-25		0.12	1.5-3		0.3 - 3.5
Heptadecanoic (C17:0)							0.13			
Stearic (C18)	3.5	0.1	1.37-3.91	3	0.5-8	33-48	4.07	3-8	2-4	0.5 - 3.5
Oleic (C18:1)	19.1	19.6	42.78-52.87	19.1	50-67	35-50	17.45	65-80	5-12	53 - 86
Linoleic (C18:2)	15.3	59.7	9.20-17.23	68.3	1.5-5	4.0-8	59.45	1.5-5	60-85	3.5 - 20
Linolenic (C18:3)	57		4.81-9.02	2.8	0.5-1.9		0.27	1-1.5		0 - 1.5
Arachidic (C20)			1.61-2.30		1.5-5	1-7	0.51	2-5		Trace
Eicosenoic (C20:1)			3.86-5.30		1.5-3.1		0.2	2.5-4		
Eicosadienoic (C20:2)										
Arachidonic (C20:4)				0.68						
Behenic (C22)			4.75-5.99		0.3-1			8-8.6		Trace
Erucic (C22:1)			0.51-1.47		1			3		
Docosadienoic (C22:2)										
Docosahexaenoic (C22:6)										
Lignoceric (C24)								Trace		Trace
Others									α-Linolenic (C18:3) = 1% γ-Linolenic = 7-12%	

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued).

Fatty Acids [a]	Olea Europaea (Olive) Husk Oil[132]	Olive Acid[87]	Orbignya Cohune Seed Oil [Cohune][6]	Orbignya Oleifera Seed Oil [Babassu][6]	Orbignya Speciosa Kernel Oil[195]	Oryza Sativa (Rice) Bran Oil[134]	Oryza Sativa (Rice) Germ Oil[28]	Passiflora Edulis Seed Oil [Passion Fruit][135]	Perilla Ocymoides Seed Oil [Perilla][6]
Caproic (C6)									
Caprylic (C8)			7.5	4 to 8	2-10				
Capric (C10)			6.5	4 to 8	2-12				
Lauric (C12)			46.5	44 - 47	35-50				
Myristic (C14)		≤1.0	16	15 - 20	12-25		6.92[28]	0.03	
Myristoleic (C14:1)									
Palmitic (C16)	14.96	9-15	9.5	6 to 9	4-15	14	9.28	8.57	
Palmitoleic (C16:1)	2.18	≤2					4.41[28]	0.23	
Heptadecanoic (C17:0)		≤0.5							
Stearic (C18)	1	2-5	3	3 to 5	1-7	2	7.91[28]	1.66	
Oleic (C18:1)	64.08	69-78	10	10 to 12	5-20	45	17.81[28]	16.25	14-23
Linoleic (C18:2)	16.09	8-14	1	1 to 3	<3	34	16.22[28]	72.69	16
Linolenic (C18:3)	0.71	≤3.5				1	15.56[28]	0.26	63-70
Arachidic (C20)							3.08[28]		
Eicosenoic (C20:1)									
Eicosadienoic (C20:2)									
Arachidonic (C20:4)							5.48[28]		
Behenic (C22)									
Erucic (C22:1)									
Docosadienoic (C22:2)									
Docosahexaenoic (C22:6)									
Lignoceric (C24)									
Others							Arachidontrienoic = 5.21[28]	Unspecified other fatty acids = 0.31	

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued).

Fatty Acids [a]	Persea Gratissima (Avocado) Oil[6]	Pistacia Vera Seed Oil [Pistachio][75]	Plukenetia Volubilis Seed Oil [Sacha Inchi][196]	Prunus Amygdalus (Sweet Almond) Oil[6,71,137-139,197]	Prunus Armeniaca (Apricot) Kernel Oil[144]	Prunus Avium (Sweet) Cherry Seed Oil[d,140,141]	Prunus Domestica Seed Oil [Prune/Plum][142,143]	Prunus Persica (Peach) Kernel Oil[145]
Caproic (C6)								
Caprylic (C8)								
Capric (C10)								
Lauric (C12)								
Myristic (C14)		0.09	0.02	1				
Myristoleic (C14:1)								
Palmitic (C16)	13-17	7.4	4.72	4-9	4.6-6	4-10	4-9	2.0 - 7
Palmitoleic (C16:1)	3 - 5.1	0.7	0.04	0.8	1-2		1	
Heptadecanoic (C17:0)			0.12	0.2				
Stearic (C18)		0.9	3.33	2-3	0.5-1.2	1-4	3	0.5 - 3.5
Oleic (C18:1)	67-72	58.2	10.46	62-86	58-65.7 (total 18:1)	23-55	60-80	55 - 70
Linoleic (C18:2)	10 to 12	30.3	37.64	20-30	29-33 28.5 (undef. 18:2)	30-55	15-25	22 - 33
Linolenic (C18:3)		0.4	48.96	0.4	05-1.0 (undef 18:3)	13	1	≤ 1
Arachidic (C20)		0.6	0.09	0.2	0.2	2		
Eicosenoic (C20:1)		0.6	0.3	0.3				
Eicosadienoic (C20:2)								
Arachidonic (C20:4)								
Behenic (C22)		0.3		0.2				
Erucic (C22:1)		0.6		0.1				
Docosadienoic (C22:2)								
Docosahexaenoic (C22:6)								
Lignoceric (C24)								
Others			C17:1 = 0.06; gamma C18:3 = 0.24;Others = 0.02	<C16:0 = 0.1	Oleic/Linoleic = 90-93%	Eleostearic (C18:3 conj) = 10%		

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued).

Fatty Acids [a]	Punica Granatum Seed Oil [Pomegranate][146,147]	Pyrus Malus (Apple) Seed Oil[148]	Ribes Nigrum (Black Currant) Seed Oil[149-151]	Ribes Rubrum (Currant) Seed Oil[152,198]	Rosa Canina Seed Oil [Dog Rose][178,199]	Rubus Chamaemorus Seed Oil[153]	Rubus Idaeus (Raspberry) Seed Oil[68,154-156]	Schinziophyton Rautanenii Kernel Oil[157]
Caproic (C6)								
Caprylic (C8)								
Capric (C10)								
Lauric (C12)								
Myristic (C14)					0.11-0.21		0.07	
Myristoleic (C14:1)								
Palmitic (C16)	1-10	6.51-6.60	6-10	4.6-4.8	1.71-4.6		2-2.43	8
Palmitoleic (C16:1)		0-0.05			0.24-1.01			
Heptadecanoic (C17:0)					0.04			
Stearic (C18)	1-5	1.75-1.96	1-4	2-3	1.69-2.47		0.9-1	9
Oleic (C18:1)	3-12	37.49-38.55	9-16	17.1-17.8	14.71-21.7	13-19	8-13	15
Linoleic (C18:2)	2-12	50.70-51.40	40-54	36-48	47.9-54.41	40-52	47-63	37
Linolenic (C18:3)		0.19-0.30	11-18	15-30	16.42-21.8	27-38	25-40	25
Arachidic (C20)		1.49-1.54	1		1.0-2.61		0.37	
Eicosenoic (C20:1)		0.51-0.56	3		0.3			
Eicosadienoic (C20:2)					0.07			
Arachidonic (C20:4)								
Behenic (C22)		0-0.40	1		0.1-0.64			
Erucic (C22:1)			1					
Docosadienoic (C22:2)								
Docosahexaenoic (C22:6)								
Lignoceric (C24)					0.04			
Others	Punicic (C18:3conj) = 60-80; Other C18:3conj = 18%		C18:3 (n-6) = 11-18 C18:4 (n-3) = 2-5	C18:1n-7 = 0.5-0.6; C18:3n-6 = 5.6-12; C18:4n-3 = 2-5; Others = 0-0.3	C17:1 = 0.01; C21:0= 0.01, C23:0 = 0.03			

*With Palm Oil.

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued).

Fatty Acids [a]	Sclerocarya Birrea Seed Oil [Marula][158,200]	Sesamum Indicum (Sesame) Seed Oil[25,55]	Silybum Marianum Seed Oil [Thistle][201]	Solanum Lycopersicum (Tomato) Seed Oil[159]	Solanum Lycopersicum (Tomato) Fruit Oil*[202]	Theobroma Cacao (Cocoa) Seed Butter[6]	Theobroma Grandiflorum Seed Butter [Cupuacu][203]	Torreya Nucifera Seed Oil [Kaya][204]
Caproic (C6)	1.41							
Caprylic (C8)								
Capric (C10)								
Lauric (C12)				Trace-0.3				
Myristic (C14)	2.12	<0.5		1.5-2.3			Trace	Trace
Myristoleic (C14:1)				Trace				
Palmitic (C16)	9-12; 22.56	7.0 - 12.0	9.4	16.9-23.4	47	24-29	7.2	6.03
Palmitoleic (C16:1)	0.05 - 0.15	<0.5		3.3-6.8			0.1	Trace
Heptadecanoic (C17:0)							0.2	Trace
Stearic (C18)	5-8; 50.76	3.5 - 6.0	6.6	4.0-9.5	3	34-36	30.8	2.51
Oleic (C18:1)	4.13; 70 - 78	35 - 50	21.3	18.3-29.7	30	30-40	43.9	30.35
Linoleic (C18:2)	4.0 - 7.0	35 - 50	53.3	37.6-42.8	12	2.4	4.6	51.26
Linolenic (C18:3)	0.1 - 0.6	<1.0	trace	Trace-0.7			Trace	0.23
Arachidic (C20)	0.3 - 0.7	<1.0	3.8	0.8-1.3			11	
Eicosenoic (C20:1)	0.1 - 0.5	<0.5	0.5					0.28
Eicosadienoic (C20:2)								0.98
Arachidonic (C20:4)	8.46							
Behenic (C22)	5.14	<0.5	2.4	Trace-0.7				
Erucic (C22:1)	0.1 - 0.5							
Docosadienoic (C22:2)								
Docosahexaenoic (C22:6)								
Lignoceric (C24)	4.13		0.7					
Others	Butyric = 0.35%	Trace of components below C14			Other (C14 + C20) = 8			C18:1 Δ11 = 0.57; C18:3 Δ5,9,12 = 0.08; C20:2 Δ 5,11 = 0.79; C20:3 Δ5,11,14 = 6.68; Others = 0.24

Table 4. Total fatty acid composition of plant-derived fatty acid oils (%) (continued).

Fatty Acids [a]	Triticum Vulgare (Wheat) Germ Oil[30,52]	Vaccinium Corymbosum (Blueberry) Seed Oil[68,160,161]	Vaccinium Macrocarpon (Cranberry) Seed Oil[68,162-165]	Vaccinium Myrtillus Seed Oil [Bilberry][166,205]	Vaccinium Vitis-Idaea Seed Oil [Lingonberry][167,205]	Vitis Vinifera (Grape) Seed Oil[6]	Zea Mays (Corn) Oil[53,168,169]	Zea Mays (Corn) Oil[53,168,169]
Caproic (C6)								
Caprylic (C8)								
Capric (C10)								
Lauric (C12)		0.02	0.14					
Myristic (C14)		0.09	0.08	2.2-2.5	1.6-2.6		0.1 - 1.7	0.1 - 1.7
Myristoleic (C14:1)								
Palmitic (C16)	11.0 - 16	3-8	4-6	4.8-7.4	4.4-6.7	7-9.5	8-16.5	8-16.5
Palmitoleic (C16:1) Heptadecanoic (C17:0)							0.2 - 1.6	0.2 - 1.6
Stearic (C18)	1.0 - 6	0.5-3.5	1-1.25	2.2-2.5	1.2-1.9	3.5-5.5	0-4.5	0-4.5
Oleic (C18:1)	8.0 - 30	15-25	15-25.3	17.4-23	10-25	14-44	19 – 49	19 – 49
Linoleic (C18:2)	44 - 65	35-45	32-42	35-47.5	30-46.8	46-74	34-66	34-66
Linolenic (C18:3)	4.0 - 10	22-38	30-40	23.1-40	25.2-55		0-2	0-2
Arachidic (C20)		0.25	0.07				1	1
Eicosenoic (C20:1)							1	1
Eicosadienoic (C20:2)								
Arachidonic (C20:4)								
Behenic (C22)								
Erucic (C22:1)								
Docosadienoic (C22:2) Docosahexaenoic (C22:6)								
Lignoceric (C24)								
Others	0 - 1.2 C20-22 Saturated acids		α-Linolenic (C18:3) = 34-35%					

[a]Shading identifies previously reviewed ingredients, with gray shading for ingredients with safe and red shading for ingredients with insufficient data conclusions. [b]Macadamia integrifolia and macadamia ternifolia are synonyms; information is being reported under the more common name. [c]As mango kernel fat. [d]As cherry kernel oil. [e]As Bassia Latifolia seed fat or madhuca indica seed fat. [f]As caryocar Brasiliense pulp oil. [g]As garcinia indica seed fat. [h]As bassia butyracea seed fat. [I]As Hippophae pulp oil.

Table 5a. Frequency of use according to duration and exposure - ingredients not previously reviewed by the CIR

	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)
	Actinidia Chinensis (Kiwi) Seed Oil		**Adansonia Digitata Oil**		**Aleurities Moluccana Seed Oil**		**Anacardium Occidentale (Cashew) Seed Oil**		**Argania Spinosa Kernel Oil**		**Astrocaryum Murumuru Seed Butter**	
Totals*	**7**	**0.1**	**6**	**0.01**	**141**	**0.00001-5**	**10**	**0.002-1**	**100**	**0.001-10**	**192**	**0.001-7**
Duration of Use												
Leave-On	*5*	*NR*	*4*	*0.01*	*87*	*0.00002-5*	*9*	*0.04-1*	*87*	*0.001-10*	*171*	*0.001-7*
Rinse-Off	*2*	*0.1*	*2*	*NR*	*54*	*0.00001-3*	*1*	*0.002*	*13*	*0.001-2*	*21*	*0.001-0.2*
Exposure Type												
Eye Area	NR	NR	NR	NR	6	0.0001-0.005	NR	NR	11	0.1-1	21	0.06-0.5
Possible Ingestion	1	NR	NR	0.01	1	0.01	NR	NR	9	0.1-1	22	1-7
Inhalation	1	NR	NR	NR	15	0.1	NR	NR	NR	0.01	NR	NR
Dermal Contact	5	NR	5	0.01	76	0.00001-5	9	0.002-1	88	0.001-10	178	0.001-7
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.001	NR	NR
Hair - Non-Coloring	2	0.1	1	NR	58	0.00002-0.1	1	NR	8	0.01-1	11	0.001-0.2
Hair - Coloring	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.07-0.1	3	NR
Nail	NR	NR	NR	NR	4	NR	NR	NR	2	0.001-0..1	NR	NR
Mucous Membrane	NR	NR	NR	NR	5	0.00001-0.4	NR	NR	2	0.001-2	3	NR
Bath Products	NR	NR	NR	NR	6	0.01-0.3	NR	NR	1	0.05	NR	NR
Baby Products	NR	NR	1	NR	NR	NR	NR	NR	NR	NR	NR	NR

	Sodium Astrocaryum Murumuruate		**Avena Sativa (Oat) Kernel Oil**		**Bassia Latifolia Seed Butter**		**Bertholletia Excelsa Seed Oil**		**Borago Officinalis Seed Oil**		**Brassica Campestris (Rapeseed) Seed Oil**	
Totals	**NR**	**0.002-0.005**	**43**	**0.01-3**	**22**	**0.001-2**	**55**	**0.0003-0.5**	**180**	**0.001-1**	**27**	**0.007-17**
Duration of Use												
Leave-On	*NR*	*0.002*	*37*	*0.1-3*	*17*	*0.001-0.05*	*18*	*0.0003-0.5*	*160*	*0.001-1*	*23*	*0.007-17*
Rinse-Off	*NR*	*0.002-0.005*	*6*	*0.001-0.1*	*5*	*0.001-2*	*37*	*0.01-0.2*	*20*	*0.001-0.01*	*4*	*0.1-1*
Exposure Type												
Eye Area	NR	NR	NR	0.2	4	0.01	1	NR	7	0.001-0.5	2	NR
Possible Ingestion	NR	NR	NR	2	NR	NR	NR	NR	NR	0.01	1	9
Inhalation	NR	NR	NR	NR	NR	NR	1	NR	3	0.1	NR	NR
Dermal Contact	NR	0.002-0.005	41	0.001-3	22	00.01-2	29	0.0003-0.5	168	0.001-1	27	0.007-17
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	NR	NR	2	0.1	NR	0.001-0.5	12	0.03-0.2	10	NR	NR	0.1
Hair - Coloring	NR	NR	NR	NR	NR	NR	14	NR	NR	NR	NR	NR
Nail	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mucous Membrane	NR	0.002	2	0.01-0.1	5	NR	7	0.01	4	0.001-0.01	1	NR
Bath Products	NR	NR	1	NR	NR	NR	3	NR	1	NR	NR	NR
Baby Products	NR	NR	6	0.1	NR	NR	NR	NR	3	NR	NR	NR

Table 5a. Frequency of use according to duration and exposure. - ingredients not previously reviewed by the CIR (continued)

	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)
	Hydrogenated Rapeseed Oil		**Brassica Oleracea Italica (Broccoli) Seed Oil**		**Butyrospermum Parkii (Shea) Oil**		**Butyrospermum Parkii (Shea) Butter**		**Butyrospermum Parkii (Shea) Butter Unsaponifiables**		**Hydrogenated Shea Butter**	
Totals	**1**	**0.3-4**	**NR**	**0.001-3**	**22**	**0.01-15**	**1950**	**0.0005-60**	**38**	**0.06-3**	**4**	**1**
Duration of Use												*1*
Leave-On	*NR*	*0.3-4*	*NR*	*3*	*16*	*0.01-15*	*1680*	*0.001-60*	*35*	*0.06-3*	*2*	*1*
Rinse-Off	*1*	*NR*	*NR*	*0.001-0.5*	*22*	*0.6-1*	*270*	*0.0005-30*	*3*	*NR*	*2*	*1*
Exposure Type												
Eye Area	NR	2	NR	NR	1	NR	108	0.1-8	7	0.2-0.7	NR	NR
Possible Ingestion	NR	NR	NR	NR	NR	15	128	0.5-26	2	3-Jan	NR	NR
Inhalation	NR	NR	NR	NR	NR	NR	17	0.001-3	NR	NR	NR	NR
Dermal Contact	1	0.3-4	NR	NR	22	0.6-15	1724	0.001-45	33	0.06-3	4	1
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	2	1	NR	NR	NR	NR
Hair - Non-Coloring	NR	NR	NR	NR	NR	NR	210	0.0005-3	5	2	NR	NR
Hair - Coloring	NR	NR	NR	0.001-3	NR	NR	4	NR	NR	NR	NR	NR
Nail	NR	NR	NR	NR	NR	0.01-1	7	0.01-60	NR	NR	NR	NR
Mucous Membrane	NR	NR	NR	NR	3	0.6	101	0.003-5	NR	NR	NR	NR
Bath Products	NR	NR	NR	NR	3	1	13	1	NR	NR	2	NR
Baby Products	NR	NR	NR	NR	NR	NR	24	0.01-5	NR	NR	NR	NR

	Camelina Sativa Seed Oil		**Camellia Japonica Seed Oil**		**Camellia Kissi Seed Oil**		**Camellia Oleifera Seed Oil**		**Hydrogenated Camellia Oleifera Seed Oil**		**Camellia Sinensis Seed Oil**	
Totals	**76**	**0.002-1**	**NR**	**0.01-0.2**	**47**	**0.1-10**	**25**	**0.003-3**	**1**	**NR**	**12**	**0.1**
Duration of Use												
Leave-On	*61*	*0.002-1*	*NR*	*0.01-0.2*	*34*	*0.1-10*	*23*	*0.003-3*	*1*	*NR*	*8*	*0.1*
Rinse-Off	*15*	*1*	*NR*	*0.1*	*13*	*0.1-3*	*2*	*0.01-0.1*	*NR*	*NR*	*4*	*0.1*
Exposure Type												
Eye Area	NR	0.05	NR	0.01	4	0.1	NR	2	NR	NR	NR	NR
Possible Ingestion	34	0.05-0.5	NR	0.1	1	0.1	3	3	NR	NR	1	0.1
Inhalation	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dermal Contact	47	0.002-1	NR	0.01-0.2	36	0.1-10	23	0.003-3	1	NR	10	0.1
Deodorant (Underarm)	NR	NR	NR	0.01	NR	NR	NR	NR	NR	NR	NR	0.1
Hair - Non-Coloring	29	1	NR	0.1	11	0.1-1	2	2	NR	NR	2	0.1
Hair - Coloring	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nail	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mucous Membrane	NR	NR	NR	0.1	1	0.1	NR	0.01-0.1	NR	NR	2	0.1
Bath Products	NR	NR	NR	NR	1	0.3	NR	0.05	NR	NR	NR	NR
Baby Products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Table 5a. Frequency of use according to duration and exposure. - ingredients not previously reviewed by the CIR (continued)

	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)
	Canola Oil		**Canola Oil Unsaponifiables**		**Hydrogenated Canola Oil**		**Carica Papaya Seed Oil**		**Caryocar Brasiliense Fruit Oil**		**Chenopodium Quinoa Seed Oil**	
Totals	**132**	**0.0002-73**	**NR**	**0.001**	**3**	**NR**	**NR**	**0.1**	**31**	**0.0005-0.2**	**1**	**0.3**
Duration of Use												
Leave-On	*112*	*0.002-73*	*NR*	*NR*	*2*	*NR*	*NR*	*0.1*	*29*	*0.0005-2*	*1*	*NR*
Rinse-Off	*20*	*0.02-33*	*NR*	*0.0001*	*1*	*NR*	*NR*	*NR*	*2*	*NR*	*NR*	*0.3*
Exposure Type												
Eye Area	3	0.002-0.03	NR	NR	NR	NR	NR	NR	12	NR	NR	NR
Possible Ingestion	62	0.3-70	NR	NR	NR	NR	NR	NR	12	0.2	NR	NR
Inhalation	1	0.0002-17	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dermal Contact	113	0.0002-73	NR	NR	3	NR	NR	0.1	30	0.0005-0.2	NR	NR
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	19	0.006-24	NR	0.001	NR	NR	NR	NR	1	NR	1	NR
Hair - Coloring	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.3
Nail	NR	5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mucous Membrane	2	0.02-1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bath Products	1	1-33	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Baby Products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

	Citrullus Lanatus (Watermelon) Seed Oil		**Citrullus Vulgaris (Watermelon) Seed Oil****		**Citrus Limon (Lemon) Seed Oil**		**Citrus Paradisi (Grapefruit) Seed Oil**		**Crambe Abyssinica Seed Oil**		**Cucumis Sativus (Cucumber) Seed Oil**	
Totals	**1**	**2**	**5**	**NR**	**6**	**6**	**NR**	**0.01-20**	**6**	**NR**	**6**	**NR**
Duration of Use												
Leave-On	*1*	*2*	*3*	*NR*	*5*	*5*	*NR*	*0.08-20*	*5*	*NR*	*5*	*NR*
Rinse-Off	*NR*	*NR*	*2*	*NR*	*1*	*1*	*NR*	*0.01-1*	*1*	*NR*	*1*	*NR*
Exposure Type												
Eye Area	NR	NR	NR	NR	NR	1	NR	NR	NR	NR	1	NR
Possible Ingestion	NR	NR	NR	NR	NR	NR	NR	5	NR	NR	NR	NR
Inhalation	NR	NR	NR	NR	NR	NR	NR	2	NR	NR	NR	NR
Dermal Contact	1	2	5	NR	6	5	NR	2-5	6	NR	5	NR
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	NR	NR	NR	NR	NR	1	NR	0.01-20	NR	NR	1	NR
Hair - Coloring	NR	NR	NR	NR	NR	NR	NR	9	NR	NR	NR	NR
Nail	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mucous Membrane	NR	NR	1	NR	1	NR	NR	NR	1	NR	NR	NR
Bath Products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Baby Products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Table 5a. Frequency of use according to duration and exposure. - ingredients not previously reviewed by the CIR (continued)

	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)
	Cucurbita Pepo (Pumpkin) Seed Oil		**Palm Kernel Acid**		**Potassium Palm Kernelate**		**Potassium Palmate**		**Sodium Palm Kernelate**		**Sodium Palmate**	
Totals	**18**	**0.003-0.1**	**72**	**0.2-12**	**7**	**0.3-30**	**5**	**0.3-3**	**194**	**12-44**	**212**	**3-68**
Duration of Use												
Leave-On	*17*	*0.003-0.1*	*3*	*NR*	*NR*	*NR*	*NR*	*NR*	*10*	*NR*	*7*	*NR*
Rinse-Off	*1*	*NR*	*69*	*0.2-12*	*7*	*0.3-30*	*5*	*0.3-3*	*184*	*12-44*	*205*	*3-68*
Exposure Type												
Eye Area	1	0.003	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Possible Ingestion	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Inhalation	1	NR	NR	NR	NR	NR	NR	NR	1	NR	1	NR
Dermal Contact	18	0.003-0.1	71	0.2-12	7	0.3-30	5	0.3-3	194	12-44	212	3-68
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	1	NR	1	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hair - Coloring	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nail	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mucous Membrane	NR	NR	64	0.2-3	1	0.3-30	2	0.3-3	173	16-44	189	3-68
Bath Products	NR	NR	NR	NR	NR	NR	NR	NR	3	NR	1	NR
Baby Products	NR	NR	NR	NR	NR	NR	NR	NR	4	NR	3	NR

	Palm Acid		**Elaeis Oleifera Kernel Oil**		**Euterpe Oleracea Fruit Oil**		**Garcinia Indica Seed Butter**		**Gevuina Avellana Oil**		**Glycine Soja (Soybean) Oil**	
Totals	**33**	**1-17**	**5**	**NR**	**29**	**0.00001-0.5**	**30**	**0.1-2**	**5**	**0.002-0.2**	**912**	**0.0002-95**
Duration of Use												
Leave-On	*1*	*NR*	*NR*	*NR*	*19*	*0.00001-0.5*	*27*	*0.1-2*	*5*	*0.04-0.2*	*718*	*0.0005-95*
Rinse-Off	*32*	*1-17*	*5*	*NR*	*10*	*0.05*	*3*	*NR*	*NR*	*0.002-0.01*	*194*	*0.0002-95*
Exposure Type												
Eye Area	NR	NR	NR	NR	2	0.5	1	NR	NR	NR	53	0.04-2
Possible Ingestion	NR	NR	NR	NR	1	0.002	3	0.1-2	NR	NR	103	0.6-4
Inhalation	1	NR	NR	NR	1	NR	NR	NR	NR	NR	6	0.03-0.5
Dermal Contact	33	1-17	NR	NR	14	0.00001-0.5	30	0.1-2	4	0.002-0.2	800	0.0005-93
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.01-0.5
Hair - Non-Coloring	NR	NR	2	NR	15	NR	NR	NR	NR	NR	97	0.0002-95
Hair - Coloring	NR	NR	3	NR	NR	NR	NR	NR	NR	NR	5	NR
Nail	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	6	0.02-95
Mucous Membrane	31	1-4	NR	NR	3	NR	1	NR	NR	NR	70	0.01-52
Bath Products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	19	0.1-78
Baby Products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	21	2

Table 5a. Frequency of use according to duration and exposure. - ingredients not previously reviewed by the CIR (continued)

	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)
	Glycine Soja (Soybean) Oil Unsaponifiables		**Hydrogenated Soybean Oil**		**Helianthus Annuus (Sunflower) Seed Oil**		**Helianthus Annuus (Sunflower) Seed Oil Unsaponifiables**		**Hydrogenated Sunflower Oil**		**Hippophae Rhamnoides Oil**	
Totals	**12**	**0.0001-0.2**	**36**	**0.001-42**	**1414**	**0.000007-96**	**10**	**0.005-2**	**NR**	**6-35**	**15**	**0.2-0.7**
Duration of Use												
Leave-On	*12*	*0.0001-0.2*	*33*	*0.001-39*	*1054*	*0.0002-96*	*10*	*0.005-2*	*NR*	*6-35*	*10*	*0.2-0.7*
Rinse-Off	*NR*	*NR*	*3*	*0.05-42*	*360*	*0.000007-92*	*NR*	*0.002*	*NR*	*15-35*	*5*	*0.2*
Exposure Type												
Eye Area	NR	NR	4	0.03-7	64	0.0005-19	2	0.02	NR	7	NR	NR
Possible Ingestion	NR	NR	3	0.1-39	260	0.08-41	NR	NR	NR	6	NR	NR
Inhalation	NR	NR	NR	NR	3	0.0002-85	NR	NR	NR	NR	NR	NR
Dermal Contact	12	0.0001-0.2	34	0.01-39	707	0.0002-96	10	0.005-2	NR	6-35	1	0.2-0.7
Deodorant (Underarm)	NR	NR	NR	NR	1	0.0003-4	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	NR	NR	1	0.1	179	0.000007-92	NR	NR	NR	NR	6	NR
Hair - Coloring	NR	NR	NR	NR	85	0.03-35	NR	NR	NR	15-35	NR	NR
Nail	NR	NR	NR	0.001-25	8	0.05-30	NR	NR	NR	NR	8	NR
Mucous Membrane	NR	NR	NR	0.05-6	52	0.0003-4	NR	0.002	NR	NR	1	0.2
Bath Products	NR	NR	NR	5-42	11	0.005-75	NR	NR	NR	NR	NR	NR
Baby Products	NR	NR	NR	NR	18	0.2	NR	NR	NR	NR	NR	NR

	Hippophae Rhamnoides Fruit Oil		**Irvingia Gabonensis Kernel Butter**		**Juglans Regia (Walnut) Seed Oil**		**Limnanthes Alba (Meadowfoam) Seed Oil**		**Linum Usitatissimum (Linseed) Seed Oil**		**Linseed Acid**	
Totals	**7**	**0.004-2**	**109**	**0.003-0.4**	**15**	**0.00003-0.2**	**316**	**0.002-74**	**102**	**0.001-10**	**3**	**NR**
Duration of Use												
Leave-On	*7*	*0.004-2*	*109*	*0.003-0.4*	*12*	*0.01-0.2*	*225*	*0.002-74*	*52*	*0.002-10*	*3*	*NR*
Rinse-Off	*NR*	*NR*	*NR*	*NR*	*3*	*0.00003-0.1*	*91*	*0.01-2*	*50*	*0.001-0.4*	*NR*	*NR*
Exposure Type												
Eye Area	1	NR	2	NR	1	NR	30	0.1-20	3	0.01	NR	NR
Possible Ingestion	NR	NR	64	0.003-0.3	NR	NR	67	0.6-26	NR	0.01	NR	NR
Inhalation	NR	NR	NR	NR	NR	NR	1	0.1-3	3	NR	NR	NR
Dermal Contact	6	2	108	0.003-0.4	15	0.003-0.2	211	0.002-74	58	0.003-4	3	NR
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.05-0.1	NR	NR
Hair - Non-Coloring	NR	NR	1	NR	NR	0.00003-0.1	47	0.1-1	42	0.001-0.1	NR	NR
Hair - Coloring	NR	NR	NR	NR	NR	NR	46	0.2-2	NR	NR	NR	NR
Nail	1	0.004	NR	NR	NR	NR	NR	0.5	2	0.002-0.05	NR	NR
Mucous Membrane	NR	NR	NR	NR	NR	NR	4	0.001-0.6	5	0.003-0.4	NR	NR
Bath Products	NR	NR	NR	NR	2	NR	2	0.5-0.9	1	0.02-0.2	NR	NR
Baby Products	NR	NR	NR	NR	NR	NR	1	NR	2	NR	1	NR

Table 5a. Frequency of use according to duration and exposure. - ingredients not previously reviewed by the CIR (continued)

	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)
	Luffa Cylindrica Seed Oil		**Lupinus Albus Seed Oil**		**Lycium Barbarum Seed Oil**		**Macadamia Integrifolia Seed Oil**		**Macadamia Ternifolia Seed Oil**		**Macadamia Nut Oil****	
Totals	**21**	**0.01**	**1**	**NR**	**2**	**NR**	**41**	**0.00006-5**	**533**	**0.0003-30**	**208**	**NS**
Duration of Use												
Leave-On	*21*	*NR*	*1*	*NR*	*2*	*NR*	*25*	*0.00006-5*	*482*	*0.001-30*	*191*	*NS*
Rinse-Off	*NR*	*0.01*	*NR*	*NR*	*NR*	*NR*	*16*	*0.006-3*	*51*	*0.0003-10*	*17*	*NS*
Exposure Type												
Eye Area	1	NR	NR	NR	1	NR	3	0.1	16	0.1-15	22	NS
Possible Ingestion	9	NR	NR	NR	1	NR	4	1	33	0.1-30	11	NS
Inhalation	NR	NR	NR	NR	NR	NR	NR	0.5	12	0.007-16	2	NS
Dermal Contact	21	0.01	1	NR	2	NR	36	0.00006-5	493	0.001-30	170	NS
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS
Hair - Non-Coloring	NR	NR	NR	NR	NR	NR	12	0.01-0.03	33	0.0003-16	9	NS
Hair - Coloring	NR	NR	NR	NR	NR	NR	NR	NR	3	0.02	NR	NS
Nail	NR	NR	NR	NR	NR	NR	NR	3	1	0.001-0.5	NR	NS
Mucous Membrane	NR	0.01	NR	NR	NR	NR	10	2	12	0.02-10	NR	NS
Bath Products	NR	NR	NR	NR	NR	NR	1	0.5	2	1-10	1	NS
Baby Products	NR	NR	NR	RN	NR	NR	NR	NR	4	NR	NR	NS

	Mangifera Indica (Mango) Seed Oil		**Mangifera Indica (Mango) Seed Butter**		**Sodium Mangoseedate**		**Moringa Oleifera Seed Oil**		**Moringa Pterygosperma Seed Oil**		**Oenothera Biennis (Evening Primrose) Oil**	
Totals	**72**	**0.003-6**	**175**	**0.0005-3**	**1**	**NR**	**NR**	**0.001**	**15**	**0.003-3**	**150**	**0.00002-58**
Duration of Use												
Leave-On	*64*	*0.003-6*	*134*	*0.01-5*	*NR*	*NR*	*NR*	*0.001*	*13*	*0.004-3*	*113*	*0.00002-58*
Rinse-Off	*8*	*0.05-0.2*	*41*	*0.0005-0.5*	*1*	*NR*	*NR*	*NR*	*2*	*0.003*	*37*	*0.002-0.2*
Exposure Type												
Eye Area	13	5	6	0.02	NR	NR	NR	NR	4	3	4	0.00002-0.5
Possible Ingestion	7	0.03-6	25	1-5	NR	NR	NR	NR	1	NR	14	0.1-15
Inhalation	1	NR	2	0.02	NR	NR	NR	NR	NR	NR	2	NR
Dermal Contact	60	0.003-6	147	0.0005-5	1	NR	NR	0.001	11	0.003-3	109	0.00002-58
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.2
Hair - Non-Coloring	12	0.05-0.2	12	0.02-0.5	NR	NR	NR	NR	1	0.02	37	0.05-0.1
Hair - Coloring	NR	0.05	16	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nail	NR	NR	NR	0.5	NR	NR	NR	NR	NR	NR	4	0.001-3
Mucous Membrane	2	0.1	10	0.0005-0.5	1	NR	NR	NR	NR	0.003	4	0.1-0.2
Bath Products	NR	NR	1	NR	NR	NR	NR	NR	NR	NR	2	0.2
Baby Products	NR	NR	3	NR	NR	NR	NR	NR	NR	NR	3	NR

Table 5a. Frequency of use according to duration and exposure. - ingredients not previously reviewed by the CIR (continued)

	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)
	Hydrogenated Evening Primrose Oil		**Olea Europaea (Olive) Fruit Oil**		**Olea Europaea (Olive) Oil Unsaponifiables**		**Hydrogenated Olive Oil**		**Hydrogenated Olive Oil Unsaponifiables**		**Potassium Olivate**	
Totals	**14**	**NR**	**915**	**0.0005-100**	**77**	**0.0001-3**	**50**	**0.0005-12**	**2**	**0.05-5**	**3**	**NR**
Duration of Use												
Leave-On	*14*	*NR*	*617*	*0.001-100*	*68*	*0.0001-3*	*36*	*0.1-12*	*2*	*0.05-5*	*NR*	*NR*
Rinse-Off	*NR*	*NR*	*298*	*0.0005-94*	*9*	*0.04-0.3*	*14*	*0.0005-0.1*	*NR*	*NR*	*3*	*NR*
Exposure Type												
Eye Area	1	NR	26	0.004-17	12	0.02-0.4	13	0.1-3	NR	0.3-2	NR	NR
Possible Ingestion	NR	NR	26	0.7-26	1	0.08	7	0.1-12	NR	NR	NR	NR
Inhalation	NR	NR	6	0.2-5	NR	3	NR	NR	NR	NR	NR	NR
Dermal Contact	14	NR	711	0.0005-100	67	0.0001-3	34	0.0005-12	2	0.05-5	3	NR
Deodorant (Underarm)	NR	NR	3	0.02-0.1	NR	NR	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	NR	NR	190	0.006-94	6	0.02-0.3	11	0.01-0.1	NR	NR	NR	NR
Hair - Coloring	NR	NR	NR	0.2-0.5	NR	NR	NR	NR	NR	NR	NR	NR
Nail	NR	NR	5	1-40	NR	NR	NR	NR	NR	NR	NR	NR
Mucous Membrane	NR	NR	121	0.0005-3	4	NR	1	0.0005	NR	NR	1	NR
Bath Products	NR	NR	14	0.9-17	NR	NR	NR	NR	NR	NR	NR	NR
Baby Products	NR	NR	9	0.2	NR	0.04	NR	0.4	NR	NR	NR	NR

	Sodium Olivate		**Orbignya Cohune Seed Oil**		**Orbignya Oleifera Seed Oil**		**Sodium Babassuate**		**Orbignya Speciosa Kernel Oil**		**Passiflora Edulis Seed Oil**	
Totals	**16**	**4-18**	**1**	**NR**	**161**	**0.0009-27**	**NR**	**8**	**8**	**0.5-0.9**	**62**	**0.0007-3**
Duration of Use												
Leave-On	*5*	*NR*	*NR*	*NR*	*118*	*0.0009-4*	*NR*	*NR*	*1*	*0.9*	*53*	*0.003-5*
Rinse-Off	*11*	*4-18*	*1*	*NR*	*43*	*0.01-27*	*NR*	*8*	*7*	*0.5*	*9*	*0.0007-0.005*
Exposure Type												
Eye Area	NR	NR	NR	NR	7	0.5-0.6	NR	NR	NR	NR	3	0.8
Possible Ingestion	NR	NR	NR	NR	57	0.001-2	NR	NR	NR	NR	14	0.6-3
Inhalation	NR	NR	NR	NR	5	0.02-2	NR	NR	NR	NR	3	NR
Dermal Contact	16	4-18	NR	NR	110	0.0009-27	NR	8	NR	NR	49	0.003-3
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.003
Hair - Non-Coloring	NR	NR	1	NR	43	0.02-2	NR	NR	5	0.5-0.9	10	0.007-0.5
Hair - Coloring	NR	NR	NR	NR	8	NR	NR	NR	3	NR	3	NR
Nail	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mucous Membrane	9	4-18	NR	NR	5	27	NR	8	NR	NR	1	NR
Bath Products	NR	NR	NR	NR	2	0.01-0.1	NR	NR	NR	NR	NR	0.01-0.05
Baby Products	1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Table 5a. Frequency of use according to duration and exposure. - ingredients not previously reviewed by the CIR (continued)

	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)
	Perilla Ocymoides Seed Oil		**Persea Gratissima (Avocado) Oil Unsaponifiables**		**Hydrogenated Avocado Oil**		**Persea Gratissima (Avocado) Butter**		**Sodium Avocadoate**		**Pistacia Vera Seed Oil**	
Totals	**7**	**NR**	**63**	**0.2-6**	**11**	**0.5**	**15**	**NR**	**1**	**NR**	**158**	**0.003-1**
Duration of Use												
Leave-On	*5*	*NR*	*57*	*0.5-6*	*9*	*NR*	*15*	*NR*	*NR*	*NR*	*107*	*0.08-0.2*
Rinse-Off	*2*	*NR*	*6*	*0.2*	*2*	*0.5*	*NR*	*NR*	*1*	*NR*	*51*	*0.003-1*
Exposure Type												
Eye Area	2	NR	9	0.5	NR	NR	NR	NR	NR	NR	7	NR
Possible Ingestion	NR	NR	2	3	2	NR	11	NR	NR	NR	6	NR
Inhalation	NR	NR	4	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dermal Contact	5	NR	56	0.2-3	8	NR	15	NR	1	NR	133	0.003-0.2
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	2	NR	2	6	3	0.5	NR	NR	NR	NR	16	0.05-1
Hair - Coloring	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nail	NR	NR	3	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mucous Membrane	NR	NR	NR	NR	NR	NR	NR	NR	1	NR	19	NR
Bath Products	NR	NR	4	NR	NR	NR	NR	NR	NR	NR	8	NR
Baby Products	NR	NR	1	NR	NR	NR	NR	NR	NR	NR	3	NR

	Plukenetia Volubilis Seed Oil		**Hydrogenated Sweet Almond Oil**		**Sodium Sweet Almondate**		**Prunus Armeniaca (Apricot) Kernel Oil**		**Hydrogenated Apricot Kernel Oil**		**Prunus Avium (Sweet Cherry) Seed Oil**	
Totals	**13**	**0.05-0.6**	**21**	**0.5**	**4**	**15**	**588**	**0.00001-89**	**2**	**NR**	**2**	**0.01-0.02**
Duration of Use												
Leave-On	*12*	*0.05-0.6*	*13*	*0.5*	*4*	*NR*	*449*	*0.0001-40*	*2*	*NR*	*NR*	*NR*
Rinse-Off	*1*	*NR*	*8*	*0.5*	*NR*	*15*	*139*	*0.00001-89*	*NR*	*NR*	*2*	*0.01-0.02*
Exposure Type												
Eye Area	1	NR	NR	NR	NR	NR	25	0.002-18	NR	NR	NR	NR
Possible Ingestion	3	0.6	1	NR	NR	NR	38	0.001-5	NR	NR	NR	NR
Inhalation	NR	NR	NR	NR	NR	NR	5	0.0009-1	NR	NR	NR	NR
Dermal Contact	13	0.6	15	0.5	4	15	486	0.00001-18	2	NR	2	0.01-0.02
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	1	0.003-0.1	NR	NR	NR	NR
Hair - Non-Coloring	NR	NR	6	0.5	NR	NR	78	0.0001-89	NR	NR	NR	NR
Hair - Coloring	NR	NR	NR	NR	NR	NR	10	0.1	NR	NR	NR	NR
Nail	NR	0.05	NR	NR	NR	NR	10	0.002-40	NR	NR	NR	NR
Mucous Membrane	NR	NR	1	NR	NR	15	24	0.01-9	NR	NR	2	0.01-0.02
Bath Products	NR	NR	1	NR	NR	NR	8	4	NR	NR	NR	NR
Baby Products	NR	NR	NR	NR	NR	NR	7	NR	NR	NR	NR	NR

Table 5a. Frequency of use according to duration and exposure. - ingredients not previously reviewed by the CIR (continued)

	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)
	Prunus Domestica Seed Oil		**Prunus Persica (Peach) Kernel Oil**		**Punica Granatum Seed Oil**		**Pyrus Malus (Apple) Seed Oil**		**Ribes Nigrum (Black Currant) Seed Oil**		**Rosa Canina Fruit Oil**	
Totals	**NR**	**0.04**	**22**	**0.003-22**	**46**	**0.001-1**	**8**	**NR**	**53**	**0.000001-0.3**	**121**	**0.001-19**
Duration of Use												
Leave-On	*NR*	*NR*	*16*	*0.05-22*	*44*	*0.001-1*	*8*	*NR*	*45*	*0.000001-0.3*	*106*	*0.001-19*
Rinse-Off	*NR*	*0.04*	*6*	*0.003-6*	*2*	*0.001-0.1*	*NR*	*NR*	*8*	*0.05*	*15*	*0.001-0.5*
Exposure Type												
Eye Area	NR	NR	NR	NR	2	NR	NR	NR	2	0.08	17	0.1-0.5
Possible Ingestion	NR	NR	NR	0.04-22	30	1	1	NR	7	0.03-0.1	7	0.001-2
Inhalation	NR	NR	NR	2	NR	NR	NR	NR	NR	NR	1	NR
Dermal Contact	NR	0.04	18	0.003-22	46	0.001-1	8	NR	43	0.000001-0.3	109	0.008-19
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	NR	NR	4	NR	NR	NR	NR	NR	5	NR	9	0.001-0.5
Hair - Coloring	NR	NR	NR	0.1	NR	0.1	NR	NR	NR	NR	NR	NR
Nail	NR	NR	NR	NR	NR	0.001	NR	NR	5	0.2	1	0.1-2
Mucous Membrane	NR	NR	1	NR	2	0.001	NR	NR	2	NR	3	0.001
Bath Products	NR	NR	1	0.1-1	NR	NR	NR	NR	NR	NR	1	0.5
Baby Products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

	Rubus Chamaemorus Seed Oil		**Rubus Idaeus (Raspberry) Seed Oil**		**Schinziophyton Rautanenii Kernel Oil**		**Sclerocarya Birrea Seed Oil**		**Silybum Marianum Seed Oil**		**Solanum Lycopersicum (Tomato) Fruit Oil**	
Totals	**3**	**0.1**	**10**	**0.1-5**	**6**	**NR**	**29**	**1**	**NR**	**0.5**	**NR**	**0.01-1**
Duration of Use												
Leave-On	*3*	*0.1*	*8*	*0.1-5*	*4*	*NR*	*23*	*1*	*NR*	*0.5*	*NR*	*0.001-1*
Rinse-Off	*NR*	*NR*	*2*	*NR*	*2*	*NR*	*6*	*1*	*NR*	*NR*	*NR*	*NR*
Exposure Type												
Eye Area	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.01
Possible Ingestion	NR	NR	1	NR	NR	NR	6	NR	NR	NR	NR	0.001
Inhalation	NR	NR	NR	NR	NR	NR	2	NR	NR	NR	NR	NR
Dermal Contact	3	0.1	8	0.1-5	3	NR	23	1	NR	0.5	NR	0.001-1
Deodorant (Underarm)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	NR	NR	NR	NR	3	NR	6	1	NR	NR	NR	NR
Hair - Coloring	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nail	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mucous Membrane	NR	NR	2	NR	NR	NR	2	NR	NR	NR	NR	NR
Bath Products	NR	NR	1	NR	NR	NR	NR	NR	NR	NR	NR	NR
Baby Products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Table 5a. Frequency of use according to duration and exposure. - ingredients not previously reviewed by the CIR (continued)

	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)
	Solanum Lycopersicum (Tomato) Seed Oil		**Theobroma Cacao (Cocoa) Seed Butter**		**Theobroma Grandiflorum Seed Butter**		**Triticum Vulgare (Wheat) Germ Oil Unsaponifiables**		**Wheat Germ Acid**		**Vaccinium Macrocarpon (Cranberry) Seed Oil**	
Totals	**1**	**NR**	**442**	**0.000002-37**	**153**	**0.00005-7**	**17**	**0.2**	**16**	**NR**	**21**	**0.002-2**
Duration of Use												
Leave-On	*1*	*NR*	*367*	*0.000002-37*	*119*	*0.00005-7*	*17*	*0.2*	*3*	*NR*	*18*	*0.002-2*
Rinse-Off	*NR*	*NR*	*75*	*0.0001-2*	*34*	*0.001-1*	*NR*	*NR*	*13*	*NR*	*3*	*0.003-0.1*
Exposure Type												
Eye Area	NR	NR	11	0.0002-9	21	0.1-2	1	NR	NR	NR	2	NR
Possible Ingestion	NR	NR	33	37	49	7	NR	NR	NR	NR	NR	0.3
Inhalation	NR	NR	2	0.4	NR	NR	NR	NR	NR	NR	NR	NR
Dermal Contact	1	NR	417	0.000002-37	141	0.00005-7	17	0.2	NR	NR	17	0.002-2
Deodorant (Underarm)	NR	NR	NR	0.001-1	NR	0.1	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	NR	NR	24	0.01-2	9	0.001-1	NR	NR	16	NR	4	0.01-0.1
Hair - Coloring	NR	NR	NR	0.1	3	NR	NR	NR	NR	NR	NR	NR
Nail	NR	NR	NR	0.1-1	NR	NR	NR	NR	NR	NR	NR	NR
Mucous Membrane	NR	NR	35	0.02-2	19	0.05-0.1	NR	NR	NR	NR	1	0.003-0.1
Bath Products	NR	NR	4	0.1-1	4	NR	NR	NR	NR	NR	NR	NR
Baby Products	NR	NR	8	0.01	NR	NR	NR	NR	NR	NR	NR	NR

	Vaccinium Myrtillus Seed Oil		Vaccinium Oxycoccos (Cranberry) Seed Oil**		Vaccinium Vitis-Idaea Seed Oil		Vegetable (Olus) Oil		Hydrogenated Vegetable Oil		Vitis Vinifera (Grape) Seed Oil	
Totals	**33**	**0.01-0.1**	**4**	**NS**	**9**	**NR**	**165**	**0.0005-31**	**457**	**0.0004-60**	**465**	**0.001-43**
Duration of Use												
Leave-On	*32*	*0.01-0.12*	*3*	*NS*	*9*	*NR*	*135*	*0.0005-11*	*439*	*0.0005-60*	*368*	*0.001-41*
Rinse-Off	*1*	*NR*	*1*	*NS*	*NR*	*NR*	*30*	*0.002-31*	*18*	*0.0004-8*	*97*	*0.001-43*
Exposure Type												
Eye Area	NR	NR	NR	NS	NR	NR	11	0.01-11	102	0.008-49	14	0.01-5
Possible Ingestion	29	0.01	NR	NS	NR	NR	74	0.03-11	216	0.8-60	34	0.03-7
Inhalation	NR	NR	NR	NS	NR	NR	1	0.0005-0.02	1	3	6	0.001-7
Dermal Contact	33	0.01-0.1	4	NS	1	NR	143	0.0005-31	450	0.005-60	401	0.001-41
Deodorant (Underarm)	NR	NR	NR	NS	NR	NR	NR	---	NR	NR	NR	0.001-0.2
Hair - Non-Coloring	NR	NR	NR	NS	NR	NR	2	0.02-2	2	0.0005-0.09	46	0.01-0.3
Hair - Coloring	NR	NR	NR	NS	NR	NR	18	---	NR	0.0004-1	10	43
Nail	NR	NR	NR	NS	8	NR	1	2	1	0.2	8	0.001-35
Mucous Membrane	NR	NR	NR	NS	NR	NR	1	0.03-2	2	2-4	21	0.001-7
Bath Products	NR	NR	NR	NS	NR	NR	2	0.002-0.02	NR	0.5	8	0.01-2
Baby Products	NR	NR	NR	NS	NR	NR	1	---	NR	NR	5	NR

Table 5a. Frequency of use according to duration and exposure. - ingredients not previously reviewed by the CIR (continued)

	No. of Uses 2010	Conc of Use (2010) (%)	No. of Uses 2010	Conc of Use (2010) (%)
	Hydrogenated Grapeseed Oil		**Sodium Grapeseedate**	
Totals	**7**	**0.3-0.5**	**4**	**NR**
Duration of Use				
Leave-On	*4*	*0.3-0.5*	*4*	*NR*
Rinse-Off	*3*	*0.5*	*NR*	*NR*
Exposure Type				
Eye Area	NR	NR	NR	NR
Possible Ingestion	1	0.5	NR	NR
Inhalation	NR	NR	NR	NR
Dermal Contact	5	0.5	NR	NR
Deodorant (Underarm)	NR	NR	NR	NR
Hair - Non-Coloring	1	NR	4	NR
Hair - Coloring	NR	NR	NR	NR
Nail	1	0.3	NR	NR
Mucous Membrane	1	NR	NR	NR
Bath Products	NR	NR	NR	NR
Baby Products	NR	NR	NR	NR

*Note - Because each ingredient may be used in cosmetics with multiple exposure types, the sum of all exposure types my not equal the sum of total uses.

NR - not reported to the VCRP or Council

NS - not surveyed

**not listed as an INCI name; included because of similarity

Table 5b. Current and historical frequency and concentration of use according to duration and type of exposure - previously reviewed ingredients

	# of Uses		*Conc. of Use (%)*		*# of Uses*		*Conc. of Use (%)*		*# of Uses*		*Conc. of Use (%)*		*# of Uses*		*Conc. of Use (%)*	
	Arachis Hypogaea (Peanut) Oil				**Hydrogenated Peanut Oil**				**Carthamus Tinctorius (Safflower) Seed Oil**				**Cocos Nucifera (Coconut) Oil**			
data year	*1998*	*2010*	*1984*	*2010*	*1998*	*2010*	*1998*	*2010*	***2002***	***2010***	***2003***	***2010***	*2007*	*2010*	*2008*	*2010*
Totals*	**22**	**74**	**mostly ≤25; >50 (1 use)**	**0.0001-30**	**19**	**12**	**	**2-5**	**142**	**508**	**0.00005-84**	**NS**	**626**	**798**	**0.0001-80**	**NS**
Duration of Use																
Leave-On	*14*	*59*	**	*0.0001-1*	*19*	*12*	**	*2-5*	*114*	*402*	*0.00005-84*	*NS*	*243*	*409*	*0.005-80*	*NS*
Rinse Off	*8*	*15*	**	*0.0002-30*	*NR*	*NR*	**	*NR*	*28*	*106*	*0.001-72*	*NS*	*383*	*389*	*0.0001-16*	*NS*
Exposure Type																***NS***
Eye Area	NR	4	**	NR	NR	NR	**	NR	5	15	1-6	NS	7	25	0.01-80	NS
Possible Ingestion	3	NR	**	NR	NR	NR	**	2	18	83	0.1-60	NS	19	44	0.2-51	NS
Inhalation	NR	2	**	NR	NR	NR	**	NR	3	5	5	NS	7	10	0.01-26	NS
Dermal Contact	19	53	**	0.0001-1	19	12	**	2-5	113	395	0.001-72	NS	380	548	0.005-80	NS
Deodorant (underarm)	NR	NR	**	NR	NR	NR	**	NR	NR	NR	NR	NS	NR	NR	0.1-16	NS
Hair - Non-Coloring	3	21	**	25-30	NR	NR	**	NR	28	79	0.00005-27	NS	97	176	0.0001-13	NS
Hair-Coloring	NR	NR	**	NR	NR	NR	**	NR	NR	20	1	NS	145	69	NR	NS
Nail	NR	NR	**	NR	NR	NR	**	NR	1	32	84	NS	2	5	0.005-2	NS
Mucous Membrane	4	2	**	NR	NR	NR	**	NR	NR	31	NR	NS	12	161	0.0005-16	NS
Bath Products	NR	NR	**	NR	NR	NR	**	NR	NR	3	7	NS	141	15	0.004-23	NS
Baby Products	NR	NR	**	NR	NR	NR	**	NR	NR	6	10	NS	12	15	0.010-0.3	NS

	Hydrogenated Coconut Oil				**Magnesium Cocoate**				**Potassium Cocoate**				**Sodium Cocoate**			
data year	*2007*	*2010*	*2008*	*2010*	*2007*	*2010*	*2008*	*2010*	*2007*	*2010*	*2008*	*2010*	*2007*	*2010*	*2008*	*2010*
Totals	**62**	**105**	**0.001-50**	**NS**	**11**	**9**	**NR**	**NS**	**24**	**40**	**0.003-40**	**NS**	**230**	**340**	**1-52**	**NS**
Duration of Use																
Leave-On	*55*	*79*	*0.001-50*	*NS*	*NR*	*NR*	*NR*	*NS*	*4*	*NR*	*28*	*NS*	*12*	*16*	*NR*	*NS*
Rinse-Off	*7*	*26*	*0.001-38*	*NS*	*11*	*9*	*NR*	*NS*	*20*	*40*	*0.03-40*	*NS*	*218*	*324*	*1-52*	*NS*
Exposure Type																
Eye Area	9	7	0.2-22	NS	NR	NR	NR	NS	NR	NR	NR	NS	NR	NR	NR	NS
Possible Ingestion	6	10	0.7-29	NS	NR	NR	NR	NS	NR	NR	NR	NS	NR	NR	NR	NS
Inhalation	NR	NR	0.3	NS	NR	NR	NR	NS	NR	NR	NR	NS	1	NR	NR	NS
Dermal Contact	3	102	0.001-25	NS	11	9	NR	NS	22	38	0.3-40	NS	175	269	1-52	NS
Deodorant (underarm)	NR	NR	NR	NS	NR	NR	NR	NS	NR	NR	NR	NS	NR	NR	NR	NS
Hair - Non-Coloring	3	3	0.001-2	NS	NR	NR	NR	NS	2	2	15	NS	55	71	2	NS
Hair-Coloring	NR	NR	0.5-0.6	NS	NR	NR	NR	NS	NR	NR	0.003	NS	NR	NR	NR	NS
Nail	NR	NR	0.8-25	NS	NR	NR	NR	NS	NR	NR	NR	NS	NR	NR	NR	NS
Mucous Membrane	NR	18	1-17	NS	NR	NR	NR	NS	NR	8	0.3	NS	1	238	1-2	NS
Bath Products	1	NR	0.5-39	NS	NR	NR	NR	NS	11	NR	0.3-40	NS	149	3	1-52	NS
Baby Products	1	1	2-50	NS	NR	NR	NR	NS	NR	NR	NR	NS	2	5	NR	NS

Table 5b. Current and historical frequency and concentration of use according to duration and type of exposure - previously reviewed ingredients (continued)

	# of Uses		Conc. of Use (%)		# of Uses		Conc. of Use (%)		# of Uses		Conc. of Use (%)		# of Uses		Conc. of Use (%)	
	Coconut Acid				**Hydrogenated Coconut Acid**				**Corylus Americana (Hazel) Seed Oil**				**Corylus Avellana (Hazel) Seed Oil**			
data year	*2007*	*2010*	*2008*	*2010*	*2007*	*2010*	*2008*	*2010*	*1998*[#]	*2010*	*1998*	*2010*	*1998*[#]	*2010*	*1997*	*2010*
Totals	**142**	**141**	**0.03-14**	**NS**	**NR**	**NR**	**6-10**	**NS**	**#**	**10**	**	**NR**	**85**	**150**	**≤100**	**0.005-98**
Duration of Use																
Leave-On	*18*	*17*	*NR*	*NS*	*NR*	*NR*	*6*	*NS*	*#*	*9*	**	*NR*	*74*	*131*	**	*0.005-98*
Rinse Off	*124*	*124*	*0.03-14*	*NS*	*NR*	*NR*	*10*	*NS*	*#*	*1*	**	*NR*	*11*	*19*	**	*0.005-5*
Exposure Type				***NS***				***NS***								
Eye Area	1	1	NR	NS	NR	NR	NR	NS	#	NR	**	NR	2	9	**	0.1
Possible Ingestion	NR	NR	NR	NS	NR	NR	NR	NS	#	NR	**	NR	NR	NR	**	14
Inhalation	NR	NR	NR	NS	NR	NR	NR	NS	#	NR	**	NR	NR	2	**	NR
Dermal Contact	140	140	0.04-14	NS	NR	NR	6-10	NS	#	10	**	NR	83	147	**	0.005-98
Deodorant (underarm)	NR	NR	NR	NS	NR	NR	NR	NS	#	NR	**	NR	NR	NR	**	NR
Hair - Non-Coloring	2	1	0.03-0.3	NS	NR	NR	NR	NS	#	NR	**	NR	1	2	**	NR
Hair-Coloring	NR	NR	NR	NS	NR	NR	NR	NS	#	NR	**	NR	NR	NR	**	NR
Nail	NR	NR	NR	NS	NR	NR	NR	NS	#	NR	**	NR	1	1	**	NR
Mucous Membrane	1	101	0.04-2	NS	NR	NR	NR	NS	#	1	**	NR	4	1	**	NR
Bath Products	93	NR	0.04-14	NS	NR	NR	NR	NS	#	NR	**	NR	2	2	**	NR
Baby Products	1	1	NR	NS	NR	NR	NR	NS	#	NR	**	NR	NR	1	**	NR

	Elaeis Guineensis (Palm) Oil				**Elaeis Guineensis (Palm) Kernel Oil**				**Hydrogenated Palm Kernel Oil**				**Hydrogenated Palm Oil**			
data year	***1997***	***2010***	***1997***	***2010***	***1997***	***2010***	***1997***	***2010***	*1997*	*2010*	*1997*	*2010*	***1997***	***2010***	***1997***	***2010***
Totals	**36**	**272**	**	**0.002-48**	**11**	**77**	**	**0.05-23**	**29**	**47**	**	**0.4-13**	**13**	**152**	**	**0.2-30**
Duration of Use																
Leave-On	*28*	*171*	**	*0.008-13*	*9*	*60*	**	*0.8-3*	*27*	*45*	**	*0.4-13*	*13*	*134*	**	*0.2-30*
Rinse-Off	*8*	*101*	**	*0.002-48*	*2*	*17*	**	*0.05-23*	*2*	*2*	**	*0.6-2*	*NR*	*18*	**	*2*
Exposure Type																
Eye Area	NR	12	**	0.04-2	NR	10	**	0.8	5	2	**	2-10	1	61	**	0.2-30
Possible Ingestion	NR	11	**	2	NR	6	**	NR	2	5	**	3-13	3	12	**	2-30
Inhalation	1	3	**	NR	NR	NR	**	NR	NR	1	**	NR	NR	NR	**	1
Dermal Contact	36	229	**	0.002-48	11	71	**	0.05-2	24	47	**	0.4-13	12	123	**	0.4-30
Deodorant (underarm)	NR	NR	**	NR	NR	NR	**	NR	NR	NR	**	NR	NR	NR	**	NR
Hair - Non-Coloring	NR	43	**	2-34	NR	6	**	0.9-23	NR	NR	**	NR	NR	NR	**	NR
Hair-Coloring	NR	NR	**	NR	NR	NR	**	NR	NR	NR	**	NR	NR	NR	**	NR
Nail	NR	NR	**	NR	NR	NR	**	3	NR	NR	**	NR	NR	NR	**	NR
Mucous Membrane	7	68	**	0.002-48	NR	10	**	0.05	2	2	**	0.9-2	NR	17	**	2
Bath Products	NR	NR	**	NR	NR	1	**	NR	NR	NR	**	NR	NR	NR	**	NR
Baby Products	1	2	**	NR	NR	NR	**	NR	NR	NR	**	NR	NR	NR	**	NR

Table 5b. Current and historical frequency and concentration of use according to duration and type of exposure - previously reviewed ingredients (continued)

	# of Uses		*Conc. of Use (%)*		*# of Uses*		*Conc. of Use (%)*		*# of Uses*		*Conc. of Use (%)*		*# of Uses*		*Conc. of Use (%)*	
	Gossypium Herbaceum (Cotton) Seed Oil				**Hydrogenated Cottonseed Oil**				**Oryza Sativa (Rice) Bran Oil**				**Oryza Sativa (Rice) Germ Oil**			
data year	*1998*	*2010*	*1998*	*2010*	*1998*	*2010*	*1998*	*2010*	*2002*	*2010*	*2000-2003*	*2010*	*2002*	*2010*	*2000-2003*	*2010*
Totals	**4**	**83**		**0.004-32**	**272**	**362**	**	**0.001-24**	**39**	**371**	**0.1-39**	**0.0003-78**	**6**	**34**	**0.1**	**0.003-3**
Duration of Use																
Leave-On	*1*	*68*		*0.08-32*	*272*	*358*	**	*0.001-24*	*32*	*267*	*0.1-8*	*0.0003-78*	*5*	*29*	*0.1*	*0.003-3*
Rinse Off	*3*	*15*	**	*0.004-29*	*NR*	*4*	**	*0.01-0.1*	*7*	*104*	*0.2-39*	*0.005-6*	*1*	*5*	*NR*	*0.003-3*
Exposure Type																
Eye Area	NR	4		0.1-11	116	155	**	0.5-24	NR	5	0.1-1	0.5-0.8	NR	2	NR	0.01-1
Possible Ingestion	NR	9	**	0.2-1	151	NR	**	8-12	NR	17	0.1-1	0.1-8	NR	4	NR	0.1-3
Inhalation	NR	12	**	0.2	NR	NR	**	NR	NR	11	NR	0.1	NR	NR	NR	NR
Dermal Contact	4	78	**	0.004-29	156	356	**	0.001-24	36	321	0.1-39	0.0003-27	6	32	0.1	0.003-3
Deodorant (underarm)	NR	1	**	0.2	NR	NR	**	NR	NR	NR	NR	0.5	NR	NR	NR	0.003
Hair - Non-Coloring	NR	2	**	NR	NR	4	**	0.01-0.1	3	42	0.3	0.005-0.5	NR	NR	NR	NR
Hair-Coloring	NR	NR	**	NR	NR	NR	**	NR	NR	NR	NR	0.3	NR	NR	NR	NR
Nail	NR	1	**	0.5-32	NR	NR	**	NR	2	5	NR	0.02-78	NR	NR	NR	NR
Mucous Membrane	NR	7	**	0.004-0.01	NR	NR	**	NR	NR	48	1	0.0006-6	NR	1	NR	0.003-0.005
Bath Products	NR	NR	**	NR	NR	NR	**	NR	1	17	1-39	0.2	NR	1	NR	0.5
Baby Products	NR	NR	**	NR	NR	8	**	NR	NR	1	NR	NR	NR	NR	NR	NR

	Persea Gratissima (Avocado) Oil				**Prunus Amygdalus Dulcis (Sweet Almond) Oil**				**Sesamum Indicum (Sesame) Seed Oil**				**Sesamum Indicum (Sesame) Oil Unsaponifiables**			
data year	*2001*	*2010*	*2001*	*2010*	*2002*	*2010*	*2002*	*2010*	*2009*	*2010*	*2008*	*2010*	*2009*	*2010*	*2008*	*2010*
Totals	**188**	**883**	**0.001-23**	**0.0001-98**	**375**	**1127**	**0.004-76**	**0.0001-77**	**402**	**480**	**0.0001-73**	**NS**	**6**	**17**	**0.01-0.03**	**NS**
Duration of Use																
Leave-On	*40*	*657*	*0.001-23*	*0.0005-98*	*302*	*791*	*0.004-76*	*0.001-77*	*313*	*374*	*0.0001-73*	*NS*	*NR*	*17*	*0.01-0.03*	*NS*
Rinse-Off	*148*	*226*	*0.1-5*	*0.0001-15*	*73*	*336*	*0.01-2*	*0.0001-43*	*89*	*106*	*0.001-68*	*NS*	*NR*	*NR*	*NR*	*NS*
Exposure Type																
Eye Area	8	24	0.1-3	0.05-2	6	28	0.4	0.1-22	11	14	0.0008-10	NS	NR	NR	0.01	NS
Possible Ingestion	29	60	0.7-21	0.05-26	3	55	0.5	0.1-19	57	52	0.1-16	NS	NR	11	0.03	NS
Inhalation	2	11	0.02-3	0.01-8	3	18	1-3	0.5-39	5	5	2	NS	NR	NR	NR	NS
Dermal Contact	165	685	0.001-23	0.0005--98	323	986	0.04-11	0.001-46	346	414	0.0008-73	NS	6	17	0.01-0.03	NS
Deodorant (underarm)	NR	NR	NR	0.1	NR	2	0.004	0.02-1	NR	NR	NR	NS	NR	NR	NR	NS
Hair - Non-Coloring	11	189	0.002-3	0.0001-41	46	116	0.3-3	0.001-19	50	59	0.0001-30[a]	NS	NR	NR	NR	NS
Hair-Coloring	8	NR	NR	0.3	2	2	0.1	0.02	NR	NR	0.03-0.8[b]	NS	NR	NR	NR	NS
Nail	4	7	0.4-19	0.001-34	4	13	1-76	0.001-77	6	7	≤1-10	NS	NR	NR	NR	NS
Mucous Membrane	NR	43	0.1-5	0.002-3	19	93	0.5	<0.1-23	4	28	NR	NS	NR	NR	NR	NS
Bath Products	5	25	0.1-5	0.6-6	10	41	0.01-0.1	0.1-43	27	5	0.09-68	NS	NR	NR	NR	NS
Baby Products	NR	9	NR	NR	7	14	NR	2-3	1	3	6	NS	NR	NR	NR	NS

Table 5b. Current and historical frequency and concentration of use according to duration and type of exposure - previously reviewed ingredients (continued)

	# of Uses		*Conc. of Use (%)*		*# of Uses*		*Conc. of Use (%)*		*# of Uses*		*Conc. of Use (%)*		*# of Uses*		*Conc. of Use (%)*	
	Triticum Vulgare (Wheat) Germ Oil				**Zea Mays (Corn) Oil**				**Zea Mays (Corn) Oil Unsaponifiables**				**Zea Mays (Corn) Germ Oil**			
data year	*2001*	*2010*	*2001*	*2010*	*2007*	*2010*	*2006*	*2010*	*2007*	*2010*	*2006*	*2010*	*2007*	*2010*	*2006*	*2010*
Totals	**303**	**527**	**0.00002-18**	**0.0001-28**	**498**	**598**	**0.00003-14**	**NS**	**7**	**1**	**NR**	**NS**	**37**	**53**	**0.2-25**	**NS**
Duration of Use																
Leave-On	*80*	*373*	*0.00002-18*	*0.0001-28*	*241*	*361*	*0.00003-14*	*NS*	*6*	*1*	*NR*	*NS*	*25*	*34*	*3-25*	*NS*
Rinse Off	*223*	*154*	*0.00002-5*	*0.001-2*	*257*	*237*	*0.001-0.07*	*NS*	*1*	*NR*	*NR*	*NS*	*12*	*19*	*0.2-3*	*NS*
Exposure Type																
Eye Area	9	12	0.00004-3	0.0001-0.5	39	35	0.0008-0.2	NS	NR	NR	NR	NS	NR	NR	NR	NS
Possible Ingestion	33	29	0.1-3	0.3-5	29	30	0.003-10	NS	NR	NR	NR	NS	NR	NR	NR	NS
Inhalation	2	7	0.0002-0.01	0.0001-0.0005	1	1	0.001-0.1	NS	NR	NR	NR	NS	NR	NR	NR	NS
Dermal Contact	220	360	0.00002-18	0.0005-23	276	371	0.00003-14	NS	7	1	NR	NS	31	50	3-25	NS
Deodorant (underarm)	NR	NR	0.02	NR	1	4	NR	NS	NR	NR	NR	NS	NR	NR	NR	NS
Hair - Non-Coloring	63	142	0.0001-2	0.0001-<1	38	40	0.0001-0.02	NS	NR	NR	NR	NS	4	3	0.2	NS
Hair-Coloring	12	20	0.1	0.01-0.2	182	183	0.004-0.007	NS	NR	NR	NR	NS	NR	NR	NR	NS
Nail	4	2	0.1-4	0.1-28	1	3	0.001-5	NS	NR	NR	NR	NS	NR	NR	NR	NS
Mucous Membrane	3	22	0.02-1	0.01-0.5	2	2	0.004-0.01	NS	NR	NR	NR	NS	4	3	3	NS
Bath Products	1	2	0.001-2	0.5	NR	NR	0.001-0.01	NS	NR	NR	NR	NS	3	4	NR	NS
Baby Products	1	9	0.5	NR	8	8	0.004	NS	NR	NR	NR	NS	2	4	NR	NS

*Note - Because each ingredient may be used in cosmetics with multiple exposure types, the sum of all exposure types my not equal the sum of total uses.

NR - not reported to the VCRP or the Council

NS - not surveyed; ingredients that were recently reviewed will not be resurveyed

** concentration of use data were not given in the original report

- was not distinguished whether C. Americana or C. Avellana was reported; arbitrarily reported under C. Avellana (Hazel) Seed Oil for this table

[a] 15% after dilution.

[b] 0.4 after dilution.

Table 5c. Ingredients with no reported use concentrations or uses.

Adansonia Digitata Seed Oil
Aleurites Moluccanus Bakoly Seed Oil
Amaranthus Hypochondriacus Seed Oil
Arctium Lappa Seed Oil
Babassu Acid
Bassia Butyracea Seed Butter
Brassica Campestris (Rapeseed) Oil Unsaponifiables
Brassica Napus Seed Oil
Brassica Oleracea Acephala Seed Oil
Canarium Indicum Seed Oil
Carya Illinoensis (Pecan) Seed Oil
Citrus Aurantifolia (Lime) Seed Oil
Citrus Aurantifolia (Lime) Seed Oil Unsaponifiables
Citrus Aurantium Dulcis (Orange) Seed Oil
Citrus Aurantium Dulcis (Orange) Seed Oil Unsaponifiables
Citrus Grandis (Grapefruit) Seed Oil
Citrus Grandis (Grapefruit) Seed Oil Unsaponifiables
Cocos Nucifera (Coconut) Seed Butter
Coix Lacryma-Jobi (Job's Tears) Seed Oil
Corn Acid
Cottonseed Acid
Cynara Cardunculus Seed Oil
Elaeis (Palm) Fruit Oil
Elaeis Guineensis (Palm) Butter
Fragaria Ananassa (Strawberry) Seed Oil
Fragaria Chiloensis (Strawberry) Seed Oil
Fragaria Vesca (Strawberry) Seed Oil
Fragaria Virginiana (Strawberry) Seed Oil
Guizotia Abyssinica Seed Oil
Hippophae Rhamnoides Seed Oil
Hydrogenated Adansonia Digitata Seed Oil
Hydrogenated Apricot Kernel Oil Unsaponifiables
Hydrogenated Argania Spinosa Kernel Oil
Hydrogenated Black Currant Seed Oil
Hydrogenated Camelina Sativa Seed Oil
Hydrogenated Cranberry Seed Oil
Hydrogenated Grapefruit Seed Oil
Hydrogenated Grapefruit Seed Oil Unsaponifiables
Hydrogenated Hazelnut Oil
Hydrogenated Kukui Nut Oil
Hydrogenated Lime Seed Oil
Hydrogenated Lime Seed Oil Unsaponifiables
Hydrogenated Macadamia Seed Oil
Hydrogenated Meadowfoam Seed Oil
Hydrogenated Orange Seed Oil
Hydrogenated Orange Seed Oil Unsaponifiables
Hydrogenated Palm Acid
Hydrogenated Passiflora Edulis Seed Oil
Hydrogenated Peach Kernel Oil
Hydrogenated Pistachio Seed Oil
Hydrogenated Pumpkin Seed Oil
Hydrogenated Punica Granatum Seed Oil
Hydrogenated Raspberry Seed Oil
Hydrogenated Rice Bran Oil
Hydrogenated Rosa Canina Fruit Oil
Hydrogenated Safflower Seed Oil
Hydrogenated Sesame Seed Oil
Hydrogenated Sweet Almond Oil Unsaponifiables
Hydrogenated Wheat Germ Oil
Hydrogenated Wheat Germ Oil Unsaponifiables
Lupinus Albus Oil Unsaponifiables
Morinda Citrifolia Seed Oil
Olea Europaea (Olive) Husk Oil
Olive Acid
Oryza Sativa (Rice) Seed Oil
Peanut Acid
Potassium Babassuate
Potassium Cornate
Potassium Hydrogenated Cocoate
Potassium Hydrogenated Palmate
Potassium Peanutate
Potassium Rapeseedate
Potassium Safflowerate
Potassium Soyate
Prunus Amygdalus Dulcis (Sweet Almond) Oil Unsaponifiables
Prunus Armeniaca (Apricot) Kernel Oil Unsaponifiables
Rapeseed Acid
Ribes Rubrum (Currant) Seed Oil
Rice Bran Acid
Safflower Acid
Sesamum Indicum (Sesame) Seed Butter
Sodium Cocoa Butterate
Sodium Hydrogenated Cocoate
Sodium Hydrogenated Palmate
Sodium Macadamiaseedate
Sodium Peanutate
Sodium Rapeseedate
Sodium Safflowerate
Sodium Sesameseedate
Sodium Soyate
Sodium Theobroma Grandiflorum Seedate
Soy Acid
Sunflower Seed Acid
Torreya Nucifera Seed Oil
Triticum Aestivum (Wheat) Germ Oil
Triticum Vulgare (Wheat) Germ Oil Unsaponifiables
Vaccinium Corymbosum (Blueberry) Seed Oil

Table 6. Examples of non-cosmetic uses of oils.

Oil	Use[6,114,206-211]
Aleurities Moluccana Seed Oil [Kukui]	wood preservative, varnishes, paint oil, illumination, soap making, waterproofing paper, rubber substitute, insulating material
Anacardium Occidentale (Cashew) Seed Oil	folk remedies
Arachis Hypogaea (Peanut) Oil	pharmaceutical, soap making, lubricants, emulsions for insect control, diesel engine fuel
Brassica Napus Seed Oil [Rapeseed]/Canola Oil	rubber additive · lubricants · fat liquoring of leather · varnishes and lacquers · textile chemicals · detergent additives · plasticizers · weed control · medicinal procedures
Butyrospermum Parkii (Shea) Oil	illumination
Camelina Sativa Seed Oil [False Flax]	drying oil · manufacturing of varnishes and paints
Citrullus Lanatus (Watermelon) Seed Oil	illumination
Cocos Nucifera (Coconut) Oil	lubricants, hydraulic fluid, paints, synthetic rubber, plastics, illumination
Elaeis Guineensis (Palm) Oil	crayon and candle manufacturing · tin plate industry
Elaeis Guineensis (Palm) Kernel Oil	detergent production · pharmaceutical · crayon and candle manufacturing · tin plate industry
Garcinia Indica Seed Butter [Kokum]	candle and soap making, sizing of cotton yarn, pharmaceutical
Guizotia Abyssinica Seed Oil [Niger/Ramtil]	paint · lubricant · pharmaceutical
Helianthus Annuus (Sunflower) Seed Oil	manufacturing of lacquers, copolymers, polyester films, modified resins, plasticizers, alkyld resins, other similar products
Juglans Regia (Walnut) Seed Oil	paints, soap making
Linum Usitatissimum (Linseed) Seed Oil	manufacturing of linoleum, cloth oil, printing and lithographic inks, core oils, linings, packings, oil-modified alkyd resins, caulking compounds, putties, leather-finishing compounds, lubricants, greases, polishes, pyrotechnic compositions · pigment binder in petrochemicals · concrete protector · stabilizer/plasticizer for vinyl plastics · industrial stains · jute textiles · drying oil in paints and varnishes
Mangifera Indica (Mango) Seed Butter	substitute for cocoa butter
Olea Europaea (Olive) Fruit Oil	textile industry · pharmaceutical
Orbignya Cohune Seed Oil	manufacturing of soaps, candles, and nightlights · cotton dyeing · ointment base · substitute for cocoa butter in food
Perilla Ocymoides Seed Oil [Perilla]	substitute for linseed oil in the manufacture of paints, varnishes, linoleum, oilclothes, and printing inks
Prunus Amygdalus Dulcis (Sweet Almond) Oil	pharmaceutical, energy source
Prunus Armeniaca (Apricot) Kernel Oil	pharmaceutical
Theobroma Cacao (Cocoa) Seed Butter	pharmaceutical
Vitis Vinifera (Grape) Seed Oil	substitute for linseed oil in the manufacture of paints, and varnishes

Table 7. Dermal effects – Non-Human studies

Ingredient	Concentration	Animals	Procedure	Results	Reference
Adansonia Digitata Seed Oil					
Adansonia Digitata (Baobab) Oil	100%		MatTek EpiDerm MTT viability assay; 100 µl of test material for 1-24 h	classified as non-irritating	212
Arachis Hypogaea (Peanut) Oil					
Undiluted technical grade Arachis Hypogaea (Peanut) Oil was moderately irritating to rabbits and guinea pig skin and mildly irritating to rat skin following exposure; there was no indication that the test site was occluded. However, in a 48 h occlusive patch test using miniature swine, technical grade Arachis Hypogaea (Peanut) Oil was not irritating					17
Arachis Hypogaea (Peanut) Oil		Hartley and/or Himalayan guinea pigs	Single drops of a store-bought peanut oil were applied to clipped skin on the backs of 4 guinea pigs. Applications were made at 2-6 wk intervals, for a total of 7 applications over a 5-mo period. It appears that the test sites were not covered. The test sites were scored 24 h after application. Well-defined erythema was considered a positive reaction.	None of the animals had a positive reaction following the initial application. Two animals had positive reactions following application at wks 6 and 12, while one animal had a positive reaction following dosing at wk 12 only	17
Butyrospermum Parkii (Shea) Butter					
Butyrospermum Parkii (Shea) Butter	not specified	3 male New Zealand White (NZW) rabbits	0.5 ml applied to the shaved dorso-lumbar region under an occlusive patch for 4 h	very slight erythema with or without edema was observed in 2 rabbits; resolved by day 3 or 4	213
Butyrospermum Parkii (Shea) Butter	induction: 75% challenge: 20 and 50%	10 female albino Hartley/Dunkin guinea pigs	maximization study with Freund's complete adjuvant (FCA) during induction	no evidence of delayed hypersensitivity	214
Carthamus Tinctorius (Safflower) Oil					
Undiluted Carthamus Tinctorius (Safflower) Seed Oil was minimally irritating in a repeat open patch test using rabbits and was not a primary irritant or sensitizer in a maximization study using guinea pigs.					32
Cocos Nucifera (Coconut) Oil					
Undiluted Cocos Nucifera (Coconut) Oil was non- irritating to rabbit skin. In guinea pigs, undiluted Cocos Nucifera (Coconut) Oil was not a sensitizer in a Magnusson-Kligman maximization study.					33
Hydrogenated Coconut Oil					
Undiluted hydrogenated coconut oil was non-irritating to rabbit skin. In guinea pigs, undiluted hydrogenated coconut oil was not a sensitizer in a Buehler test.					33
Coconut Acid					
Undiluted coconut acid was minimally irritating to rabbit skin.					33
Sodium Cocoate					
In single-insult occlusive patch tests of a 5% aq. solution of a bar soap containing 13% sodium cocoate, scores of 1.6-4.0/8.0 were reported.					33
Crambe Abyssinica Seed Oil					
Crambe Abyssinica Seed Oil	undiluted		dermal irritation study; details not provided	not a dermal irritant	215
Elaeis Guineensis (Palm) Oil					
Undiluted Elaeis Guineensis (Palm) Oil was practically non- to minimally irritating to rabbit skin. Elaeis Guineensis (Palm) Oil, 5%, was non-allergenic in a maximization study.					26
Gossypium Herbaceum (Cotton) Seed Oil					
Cosmetic formulations containing 3.4-8.97% hydrogenated cottonseed oil were not irritating to rabbit skin.					27
Hippophae Rhamnoides Seed Oil					
Hippophae Rhamnoides Seed Oil		albino rabbits, number not specified	0.5 ml applied under an occlusive patch for 4 h	no irritation	216

Table 7. Dermal effects – Non-Human studies

Ingredient	Concentration	Animals	Procedure	Results	Reference
Olea Europaea (Olive) Fruit Oil					
Olea Europaea (Olive) Fruit Oil		12 Harley and/or Himalayan guinea pigs	Single drops of a USP-grade olive oil that had been stored in its original metal container for 10 yrs were applied to a clipped area on the backs of 12 guinea pigs. (The composition of the oil was not determined.) Applications were made at 2-6 wk intervals over a period of 5 mos. Four guinea pigs were treated similarly using store-bought virgin olive oil.	None of the animals had a positive reaction following the initial application of either oil. With 10-yr-old olive oil, 11/12 of the animals had a positive reaction at some point. Some, but not all, of these guinea pigs reacted consistently following the first positive reaction; 2 animals had only 1 positive reaction; 2 guinea pigs in this group died by wk 16. In the group dosed with virgin olive oil, 1 animal had a positive reaction at wk 2 and 1 animal had a positive reaction at wks 4 and 6	217
		22 guinea pigs sensitive to the 10-yr-old USP olive oil	cross-reactivity to store-bought olive oil, another store-bought olive oil (not specified as virgin olive oil), corn oil, and peanut oil was determined. The 5 oils were applied simultaneously to the backs of the guinea pigs	18 of the animals reacted to the virgin olive oil, and 18 reacted to the other store-bought olive oil. (Overlap of these animals was not complete.) Cross-reactivity to corn or peanut oil was not observed.	
		8 sensitized and 4 non-sensitized guinea pigs	single drops of the unsaponifiable fraction of the 10-yr-old oil were applied	All of the sensitized animals reacted to the unsaponifiable fraction, while the non-sensitized animals did not.	
Oryza Sativa (Rice) Bran Oil					
Undiluted Oryza Sativa (Rice) Bran Oil was not irritating to rabbits, and in a guinea pig maximization study, no reactions were observed when 5% was used at induction and 25% and 50% Oryza Sativa (Rice) Bran Oil were used at challenge. An Oryza Sativa (Rice) Bran Oil /Oryza Sativa (Rice) Germ Oil mixture, concentrations not stated, did not cause a contact allergy response. Undiluted hydrolyzed rice protein was also not irritating or sensitizing.					28
Oryza Sativa (Rice) Germ Oil					
Oryza Sativa (Rice) Germ Oil was not a primary dermal irritant.					28
Prunus Amygdalus Dulcis (Sweet Almond) Oil					
Undiluted Prunus Amygdalus Dulcis (Sweet Almond) Oil and two moisturizer formulations, each containing 25% Prunus Amygdalus Dulcis (Sweet Almond) Oil, were tested for skin irritancy in rabbits using occlusive patches. Undiluted Prunus Amygdalus Dulcis (Sweet Almond) Oil was nonirritating (PII = 0/4). The formulations containing 25% Prunus Amygdalus Dulcis (Sweet Almond) Oil were minimally irritating (PIIs = 0.28 and 0.72, respectively). In a 60-day cumulative irritation test, 10 and 100% Prunus Amygdalus Dulcis (Sweet Almond) Oil was applied to rabbits. When tested in 7 separate trials, 100% Prunus Amygdalus Dulcis (Sweet Almond) Oil produced mean maximum irritation indices (MMIIs) ranging from 0.34 to 1.34 (maximum score = 8). At a concentration of 10%, MMIIs for this ingredient ranged from 0-0.66. Results indicated that, when applied to the skin over a long period of time, Prunus Amygdalus Dulcis (Sweet Almond) Oil is slightly irritating; whereas, at 10% it is practically nonirritating. A maximization assay was used to determine the sensitizing potential of Prunus Amygdalus Dulcis (Sweet Almond) Oil. using guinea pigs. Intradermal induction used concentrations of 5% Amygdalus Dulcis (Sweet Almond) Oil, the dose-range phase of the experiment used a single dermal application of 5%, 10%, or 100% Prunus Amygdalus Dulcis (Sweet Almond) Oil, a booster induction injection of 100% Prunus Amygdalus Dulcis (Sweet Almond) Oil was applied occlusively for 48 h 1 wk later, challenge was with 5% Prunus Amygdalus Dulcis (Sweet Almond) Oil in petrolatum applied topically under occlusion for 24 h. Prunus Amygdalus Dulcis (Sweet Almond) Oil was non-sensitizing. Undiluted Prunus Amygdalus Dulcis (Sweet Almond) Oil was tested for irritancy in groups of 6 male albino rabbits. The test material was applied under occlusion to the clipped intact and abraded dorsal skin of each animal. Twenty-three hours later, patches were removed; sites were scored at 24 and 48 hours. The Primary Irritation Indices (PIIs) for seven test samples of Prunus Amygdalus Dulcis (Sweet Almond) Oil ranged from 0 to 0.18 (maximum score = 8), indicating that this ingredient is practically nonirritating to skin.					218
Sesamum Indicum (Sesame) Seed Oil					
Undiluted Sesamum Indicum (Sesame) Seed Oil was non- or minimally irritating to rabbit skin.					55
Triticum Vulgare (Wheat) Germ Oil					
Triticum Vulgare (Wheat) Germ Oil, undiluted and at 2% in formulation, was non- to mildly irritating, and undiluted Triticum Vulgare (Wheat) Germ Oil was not sensitizing to guinea pigs.					30

Table 7. Dermal effects – Non-Human studies

Ingredient	Concentration	Animals	Procedure	Results	Reference
			Zea Mays (Corn) Oil		
corn oil, store-bought		6 Hartley and/or Himalayan guinea pigs	sensitization study, details not specified	0 of the animals had a positive reaction following the initial application; 2 animals had positive reactions following application at wks 4 and 6, while 1 animal had a positive reaction following application at wk 12	217
			PHOTOTOXICITY		
			Butyrospermum Parkii (Shea) Butter		
Butyrospermum Parkii (Shea) Butter	10 and 20% in acetone	10 Pirbright white guinea pigs	animals were treated with test compound, then irradiated with UV-B light for 80 seconds followed by UV-A light for 80 min	not phototoxic	219
			Elaeis Guineensis (Palm) Oil		
A facial lotion containing 1.5% Elaeis Guineensis (Palm) Oil was not phototoxic in the phototoxicity yeast assay.					26
			Oryza Sativa (Rice) Bran Oil		
Undiluted Oryza Sativa (Rice) Bran Oil, ≤75%,, was not phototoxic or photosensitizing.					28
			Oryza Sativa (Rice) Germ Oil		
Oryza Sativa (Rice) Germ Oil, ≤75%, was not phototoxic or photosensitizing.					28
			COMEDOGENICITY		
			Corylus Avellana (Hazel) Seed Oil		
A comedogenicity study was conducted in which 0.1 ml of Corylus Avellana (Hazel) Seed Oil (pH 6) was applied to the pinna of the ear of albino rabbits. No local irritation was noted at the application site. A "slight difference in the number and size of the pilosebaceous follicles" was noted via magnifying glass. A "slight excess of sebum and a dilation of the follicles" was noted upon microscopic examination of the treated areas					41

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
Adansonia Digitata Seed Oil				
0.01% Adansonia Digitata Seed Oil in a lip product	106	HRIPT with 0.2 g test material, semi-occluded	not a dermal irritant or sensitizer	220
100% Adansonia Digitata Seed Oil	107	HRIPT with 0.02-0.05 ml test material, semi-occluded	not a dermal irritant or sensitizer	221
Aleurites Moluccana Seed Oil				
0.005% Aleurites Moluccana Seed Oil in scalp conditioner/hair wax	104	HRIPT; occlusive; applied neat	not a dermal irritant or sensitizer	222
~3% in a skin cleanser	110	modified HRIPT; semi-occlusive; 10% dilution in distilled water	not a dermal irritant or sensitizer	223
Arachis Hypogaea (Peanut) Oil				
dermatologic product containing 0.01% fluocinolone and refined Arachis Hypogaea (Peanut) Oil	peanut-sensitive subjects; 8 children, 6 adults	skin prick test with peanut extracts, a soln, of 50% glycerin (negative control), a solution of 1.8 mg/ml histamine phosphate in 50% glycerin (positive control), the complete test product, vehicle only (without fluocinolone), and refined Arachis Hypogaea (Peanut) Oil	1 child had a trace positive reaction	224
		patch test with product, vehicle only, and refined Arachis Hypogaea (Peanut) Oil	no reactions	
Argania Spinosa Kernel Oil				
5% Argania Spinosa Kernel Oil in a face serum	108	primary cutaneous irritation	no primary irritation	225
5% Argania Spinosa Kernel Oil in a face serum	108	HRIPT; occlusive; applied neat	not an irritant or a sensitizer	225
10% Argania Spinosa Kernel Oil in a skin salve	209	HRIPT; occlusive applied neat	not a sensitizer	226
10% Argania Spinosa Kernel Oil in a skin salve	51	4-wk use test; applied to lips, hands/nails, elbows, knees, feet/heels	did not elicit significant dermal irritation or dryness; 2 subjects had level 1(mild, very slight erythema on the lips, and 5 had level 1 erythema on the elbows, lips, or knees; 15 subjects reported subjective irritation	227
Astrocaryum Murumuru				
1% Astrocaryum Murumuru Seed Butter in a lipstick	97	HRIPT with 150 mg test material, semi-occluded	not a dermal irritant or sensitizer	228
4% Astrocaryum Murumuru Seed Butter in a lipstick	108	HRIPT, occluded	not a dermal irritant or sensitizer	229
4% Astrocaryum Murumuru Seed Butter in a lipstick	108	HRIPT, occluded	not a dermal irritant or sensitizer	230
4% Astrocaryum Murumuru Seed Butter in a lipstick	108	HRIPT, occluded	not a dermal irritant or sensitizer	231
4% Astrocaryum Murumuru Seed Butter in a lipstick	106	HRIPT, occluded	not a dermal irritant or sensitizer	232
4% Astrocaryum Murumuru Seed Butter in a lipstick	106	HRIPT, occluded	not a dermal irritant or sensitizer	233
4% Astrocaryum Murumuru Seed Butter in a lipstick	108	HRIPT, occluded	not a dermal irritant or sensitizer	234

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
Avena Sativa (Oat) Kernel Oil				
3% Avena Sativa (Oat) Kernel Oil in a body and hand formulation	100	HRIPT with 0.2 ml, occluded	not a dermal irritant or sensitizer	235
Bassia Latifolia Seed Butter				
2% Bassia Latifolia Seed Butter in a body scrub	110	HRIPT with 1% aq. solution of the formulation, semi-occluded	not a dermal irritant or sensitizer	236
Borago Officinalis Seed Oil				
1% Borago Officinalis Seed Oil in a body and hand formulation	213	HRIPT with 0.2 g, occluded	not a dermal irritant or sensitizer	237
2% Borago Officinalis Seed Oil in a face serum	108	primary cutaneous irritation	no primary irritation	225
2% Borago Officinalis Seed Oil in a face serum	108	HRIPT; occlusive; applied neat	not an irritant or a sensitizer	225
Brassica Campestris (Rapeseed) Oil				
5% Hydrogenated Rapeseed Oil in a baby oil	105	HRIPT with 0.2 ml, semi-occluded	not a dermal irritant or sensitizer	238
Brassica Oleracea Italica (Broccoli) Seed Oil				
0.5% Brassica Oleracea Italica (Broccoli) Seed Oil in a hair conditioner	102	HRIPT with 150 µl of test material, 10% dilution, semi-occluded	not a dermal irritant or sensitizer	239
Butyrospermum Parkii (Shea) Butter				
Butyrospermum Parkii (Shea) Butter and fractions of unsaponifiable lipids from Butyrospermum Parkii (Shea) Butter; the "liquid" sample was obtained from a supplier; the unsaponifiable fraction was obtained through low temperature crystallization of the supplied sample	21	single applications to normal skin and sodium lauryl sulfate (SLS)-irritated skin; right volar forearm was treated with 50 µl of each test material in 12 mm Finn chambers for 48 h; the left volar forearm was treated with 50 µl of 14% aq. SLS for 7 h, rinsed, dried, and then treated with 50 µl of each test material for 17 h; cutaneous blood flow (CBF) and transepidermal water loss (TEWL) were measured	normal skin: barely perceptible erythema observed in a "small" number of subjects at 24 h after treatment with shea butter; no irritation to the shea unsaponifiable fraction; no sig. difference in CBF or TEWL SLS-treated skin: 2 subjects had a slight- and moderate reaction to the unsaponifiable fraction; no sig. difference in CBF or TEWL	240
0.1% Butyrospermum Parkii (Shea) Butter in a scalp conditioner	114	primary cutaneous irritation; formulation diluted to 1%	no primary irritation	241
2% Butyrospermum Parkii (Shea) Butter in a cream	119	primary cutaneous irritation	no primary irritation	242
0.1% Butyrospermum Parkii (Shea) Butter in a scalp conditioner	110	HRIPT; occlusive; formulation diluted to 1%	not a dermal irritant or sensitizer	241
2% Butyrospermum Parkii (Shea) Butter in a cream	118 (irritation)/ 116 (sensitization)	HRIPT; occlusive	not a dermal irritant or sensitizer	242
4% Butyrospermum Parkii (Shea) Butter in a face cream	51	HRIPT with 20 µl test material, occluded	not a dermal irritant or sensitizer	243
4% Butyrospermum Parkii (Shea) Butter in an eye cream	108	HRIPT with 20 µl test material, occluded	not a dermal irritant or sensitizer	244
23.5% Butyrospermum Parkii (Shea) Butter in a lip gloss	104	HRIPT	not a dermal irritant or sensitizer	245
23.7% Butyrospermum Parkii (Shea) Butter in a lip gloss	104	HRIPT	irritation on induction days 5-9 in one subject; no sensitization	246

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
24.1% Butyrospermum Parkii (Shea) Butter in a lip wax	113	HRIPT	not a dermal irritant or sensitizer	247
24.1% Butyrospermum Parkii (Shea) Butter in a lip wax	2 runs	Episkin	average viability 67.3% - no irritation potential	248
24.7% Butyrospermum Parkii (Shea) Butter in a lip gloss	40	28-day use study, 2-6 times /day	1 subject with desquamation	249
45% Butyrospermum Parkii (Shea) Butter in a body/hand massage	109[a]	HRIPT	not a dermal irritant or sensitizer	250
45% Butyrospermum Parkii (Shea) Butter in a body/hand massage	109[a]	HRIPT	not a dermal irritant or sensitizer	251
45% Butyrospermum Parkii (Shea) Butter in a body/hand massage	109[a]	HRIPT	not a dermal irritant or sensitizer	252
45% Butyrospermum Parkii (Shea) Butter in a body/hand massage	109[a]	HRIPT	not a dermal irritant or sensitizer	253
45% Butyrospermum Parkii (Shea) Butter in a body/hand massage	31	2-week use study, 2 time per day	no erythema, edema, or dryness	254
60% Butyrospermum Parkii (Shea) Butter in a cuticle cream	111	HRIPT	not a dermal irritant or sensitizer	255
Camelina Sativa Seed Oil				
0.25% Camelina Sativa Seed Oil in a body powder	204	HRIPT with 0.1 g, semi-occluded	not a dermal sensitizer	256
7% Camelina Sativa Seed Oil in an oil treatment	103	HRIPT with 200 µl test material, semi-occluded	Grade 1 (mild erythema) reactions in 4 subjects for 1 or 2 patches in the induction phase, grade 1 (mild erythema in different subjects at the 48 h challenge reading. Study concluded test material was not a dermal irritant or sensitizer.	257
Camellia Sinensis Seed Oil				
0.0985% Camellia Sinensis Seed Oil in a lipstick	108	HRIPT with 0.2 g, occluded	not a dermal irritant or sensitizer	258
0.0985% Camellia Sinensis Seed Oil in a lipstick	108	HRIPT with 0.2 g, occluded	not a dermal irritant or sensitizer	259
Canola Oil				
74.7% Canola Oil in a body oil	101	HRIPT with 150 µl test material, semi-occluded	not a dermal irritant or sensitizer	260
Carthamus Tinctorius (Safflower) Oil				
Cosmetic formulations containing 3-5% Carthamus Tinctorius (Safflower) Seed Oil were not irritating to humans in occlusive patch tests and were not primary irritants or sensitizers in repeated insult patch tests				32

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
5% Carthamus Tinctorius (Safflower) Seed Oil in a cleansing oil rinse-off	214	HRIPT with 0.2 ml of a 10% v/v aqueous solution, semi-occluded	3 subjects had a "?" reaction following a patch during the induction and 1 subject had definite erythema with no edema or damage to the epidermis (+D) following the 7th patch. No reactions were observed at a new test site. No other reactions were observed. Study concluded test material was not a dermal sensitizer.	261
30% Carthamus Tinctorius (Safflower) Seed Oil in a massage oil	107	HRIPT with 0.2 ml test material, semi-occluded	1 subject had slight erythema following the 7th patch that did not reoccur, no other reactions observed. Not a dermal irritant or sensitizer.	262
		Caryocar Brasiliense Fruit Oil		
0.1% Caryocar Brasiliense Fruit Oil in a lipstick	100	HRIPT with 200 mg test material, semi-occluded	not a dermal irritant or sensitizer	263
		Chenopodium Quinoa Seed Oil		
1% Chenopodium Quinoa Seed Oil in a UV SPF cream	105	HRIPT with 0.02 ml test material, occluded	"An acceptable level of irritation" was observed in the induction phase consisting of grade 1 (mild erythema) in 39 subjects, with one additional subject exhibiting a grade 2 (moderate erythema) reaction. No evidence of skin sensitization was observed.	264
1% Chenopodium Quinoa Seed Oil in a UV SPF cream	102	HRIPT with 0.02 ml test material, occluded	"An acceptable level of irritation" was observed in the induction phase, with 54% of the subjects exhibiting a grade 1 (mild erythema) reaction and 3% of the subjects exhibiting a grade 2 (moderate erythema) reaction. One subject had a strong reaction to the 3rd induction patch and discontinued the induction phase after the 6th application. At challenge, the subject had only papules at 96 h. Due to reactions to other materials tested at the same time, it could not be determined if the test material was the causative agent. No evidence of skin sensitization was observed in the remaining subjects.	265
		Citrullus Lanatus (Watermelon) Seed Oil		
2% Citrullus Lanatus (Watermelon) Seed Oil in a facial oil	105	HRIPT, semi-occluded	not a dermal irritant or sensitizer	266

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
Cocos Nucifera (Coconut) Fruit Oil				
An RIPT was performed using 103 subjects with a tanning butter containing 2.5% Cocos Nucifera (Coconut) Oil no erythematous reactions were seen at challenge; A bar soap containing 13% Cocos Nucifera (Coconut) Oil produced very mild irritation when tested as a 1% aq. solution on 106 subjects, and it was minimally to mildly irritating in a soap chamber test with a 8% aq. solution; the soap produced no unusual irritation response in a 2-wk normal use test; undiluted Cocos Nucifera (Coconut) Oil was not an allergen in 12 subjects				43
0.15% Cocos Nucifera (Coconut) Oil in a scalp conditioner/hair wax	104	HRIPT; occlusive; applied neat	not a dermal irritant or sensitizer	222
31% Cocos Nucifera (Coconut) Oil in a lip balm	222	HRIPT with 0.2 g test material, occluded	2 subjects had low-level, transient (+) reactions during the induction, no other reactions were observed. Study concluded that test material was not a dermal sensitizer.	267
Hydrogenated Coconut Oil				
Four lipstick formulations containing 10% hydrogenated coconut oil were tested with a single 48-h application on 204 females; there was no evidence of primary irritation and no indication of sensitization on retests performed 14 d later				43
Potassium Cocoate				
In a test using 40 healthy subjects and 480 patients with active skin disease, 5% aq. potassium cocoate produced 5 positive responses				43
Corylus Avellana (Hazel Seed) Oil				
A patch testing reference book by de Groot noted that the published literature does not contain recommended test concentrations concerning Hazel Seed Oil. To serve as a guide to the reader, de Groot reported that an unpublished (and at the time, ongoing) study found no irritant reaction in 1 to 20 patients suffering from or suspected to suffer from cosmetic product contact allergy who had been patch tested with 30% Hazel Seed Oil in petrolatum				41
1% Corylus Avellana (Hazel) Seed Oil in a moisturizing cream	25	Amended Draize patch test, 10% standard concentration	Non-irritating	268
1% Corylus Avellana (Hazel) Seed Oil in a moisturizing cream	32	60 day clinical study	"Fairly good acceptability"	269
5% Corylus Avellana (Hazel) Seed Oil in a massage oil	107	HRIPT with 0.2 ml test material, semi-occluded	1 subject had slight erythema following the 7th patch that did not reoccur, no other reactions observed. Not a dermal irritant or sensitizer.	262
Crambe Abyssinica Seed Oil				
5% Crambe Abyssinica Seed Oil in a face and neck product	54	HRIPT; semi-occluded, undiluted	not a dermal irritant or sensitizer	270
100% Crambe Abyssinica Seed Oil in an unspecified product	107	HRIPT; undiluted	not a dermal irritant or sensitizer	215
Elaeis Guineensis (Palm) Oil				
Elaeis Guineensis (Palm) Oil, 15% in petrolatum or cosmetic formulations containing 1.0-2.0%, was not an irritant or sensitizer in clinical studies *Bar soap flakes, tested at dilutions that contained ≤ 2.13% palm kernel oil, were not irritating or sensitizing*				26
15.7% Sodium Palm Kernelate in a soap	42	28-day use test	good acceptability for use	271
61.6% Sodium Palmate in a soap	42	28-day use test	good acceptability for use	271

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
Euterpe Oleracea Fruit Oil				
0.5% Euterpe Oleracea Fruit Oil in an eye treatment	104	HRIPT with 150 µl test material, semi-occluded	not a dermal irritant or sensitizer	272
Glycine Soja (Soybean) Oil				
0.19% Glycine Soja (Soybean) Unsaponifiables in a face and neck product	50	HRIPT, occluded	not a dermal irritant or sensitizer	273
39% Hydrogenated Soybean Oil in a lipstick	108	HRIPT, occluded	not a dermal irritant or sensitizer	274
Garcinia Indica Seed Butter				
0.3869% Garcinia Indica Seed Butter in a body and hand product	101	HRIPT, 0.2 g applied, occlusive	not a sensitizer; irritation was observed in one subject	275
Gossypium Herbaceum (Cotton) Seed Oil				
Patients that were hypersensitive to cottonseed proteins were not sensitive to cottonseed oil in a skin prick test				27
3.6% Hydrogenated Cottonseed Oil in a lip balm	222	HRIPT with 0.2 g test material, occluded	2 subjects had low-level, transient (±) reactions during the induction, no other reactions were observed. Study concluded that test material was not a dermal sensitizer.	267
Hydrogenated Cottonseed Oil				
In a clinical patch test, the irritation potential of a cosmetic formulation containing 3.4% hydrogenated cottonseed oil was mildly low, and the severity of reaction to 10.4% hydrogenated cottonseed oil was acceptably low in a use study. Cosmetic formulations containing 10.6-20.86% hydrogenated cottonseed oil were not irritating or sensitizing.				27
Helianthus Annuus (Sunflower) Seed Oil				
6% Helianthus Annuus (Sunflower) Seed Oil in a skin cream	108	primary cutaneous irritation	no primary irritation	276
20% Helianthus Annuus (Sunflower) Seed Oil in a face serum	108	primary cutaneous irritation	no primary irritation	225
0.264% Helianthus Annuus (Sunflower) Seed Oil in a cream	57	HRIPT; Finn chambers, applied neat	not a dermal irritant or sensitizer	277
6% Helianthus Annuus (Sunflower) Seed Oil in a skin cream	106	HRIPT, occlusive	not a dermal irritant or sensitizer	276
20% Helianthus Annuus (Sunflower) Seed Oil in a face serum	108	HRIPT; occlusive; applied neat	not an irritant or a sensitizer	225
1% Helianthus Annuus (Sunflower) Seed Oil in a soap	42	28-day use test	good acceptability for use	271
39.8% Helianthus Annuus (Sunflower) Seed Oil in a massage oil	107	HRIPT with 0.2 ml test material, semi-occluded	1 subject had slight erythema following the 7th patch that did not reoccur, no other reactions observed. Not a dermal irritant or sensitizer.	262
Helianthus Annuus (Sunflower) Seed Oil Unsaponifiables				
2% Helianthus Annuus (Sunflower) Seed Oil Unsaponifiables in a night product	100	HRIPT, semi-occluded	not a dermal irritant or sensitizer	273

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
2% Helianthus Annuus (Sunflower) Seed Oil Unsaponifiables in a face and neck product	100	HRIPT, semi-occluded	not a dermal irritant or sensitizer	[273]
Hippophae Rhamnoides Seed Oil				
5% Hippophae Rhamnoides Seed Oil	10	cutaneous local tolerance test, 0.02 ml single 48 h occlusive application	not an irritant; average irritation score of 0	[278]
Irvingia Gabonensis Kernel Butter				
0.31% Irvingia Gabonensis Kernel Butter in a face and neck product	52	HRIPT, occluded	not a dermal irritant or sensitizer	[273]
Limnanthes Alba (Meadowfoam) Seed Oil				
71.3% Limnanthes Alba (Meadowfoam) Seed Oil in a facial repair product	109	HRIPT, semi-occluded	7 subjects had ± on the first day of the induction only, no other reactions. Not a dermal irritant or sensitizer.	[279]
Linum Usitatissimum (Linseed) Seed Oil				
9.4% Linum Usitatissimum (Linseed) Seed Oil in mascara	105	HRIPT with 0.2 g test material, semi-occluded	not a dermal irritant or sensitizer	[280]
Luffa Cylindrica Seed Oil				
0.01% Luffa Cylindrica Seed Oil in a body wash	102	HRIPT; 0.2 ml of a 1% dilution using distilled water was applied to a 1" x 1" pad applied with a semi-occlusive patch	not a dermal irritant or sensitizer	[281]
Macadamia Ternifolia Seed Oil				
0.5% Macadamia Ternifolia Seed Oil in a cleansing oil rinse-off	214	HRIPT with 0.2 ml of a 10% v/v aqueous solution, semi-occluded	3 subjects had a "?" reaction following a patch during the induction and 1 subject had definite erythema with no edema or damage to the epidermis (+D) following the 7th patch. No reactions were observed at a new test site. No other reactions were observed. Study concluded test material was not a dermal sensitizer.	[261]
30% Macadamia Ternifolia Seed Oil in a body and hand product	55	HRIPT; semi-occluded, undiluted	not a dermal irritant or sensitizer	[270]
Mangifera Indica (Mango) Seed Oil				
2% Mangifera Indica (Mango) Seed Oil in a lipstick	100	HRIPT with 150 µl test material, semi-occluded	not a dermal irritant or sensitizer	[282]
3.87% Mangifera Indica (Mango) Seed Oil in an eyeliner	102	HRIPT with 0.2 g of test material, semi-occluded	not a dermal irritant or sensitizer	[283]
Mangifera Indica (Mango) Seed Butter				
1% Mangifera Indica (Mango) Seed Butter in a facial lotion	100	HRIPT with 200 µl test material, semi-occluded	not a dermal irritant or sensitizer	[284]
9% Mangifera Indica (Mango) Seed Butter in a body product	102	HRIPT with 0.2 g, semi-occluded	not a sensitizer	[285]

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
Moringa Oleifera Seed Oil				
0.01% Moringa Oleifera Seed Oil in a cleansing oil rinse-off	214	HRIPT with 0.2 ml of a 10% v/v aqueous solution, semi-occluded	3 subjects had a "?" reaction following a patch during the induction and 1 subject had definite erythema with no edema or damage to the epidermis (+D) following the 7th patch. No reactions were observed at a new test site. No other reactions were observed. Study concluded test material was not a dermal sensitizer.	261
Moringa Pterygosperma Seed Oil				
3% Moringa Pterygosperma Seed Oil in an eye treatment	104	HRIPT with 150 µl test material, semi-occluded	not a dermal irritant or sensitizer	286
Oenothera Biennis (Evening Primrose) Oil				
1.99% Oenothera Biennis (Evening Primrose) Oil in a foundation	600	HRIPT, occluded	not a dermal irritant or sensitizer	287
Olea Europaea (Olive) Fruit Oil				
0.7% Olea Europaea (Olive) Fruit Oil in a scalp conditioner	114	primary cutaneous irritation; formulation diluted to 1%	no primary irritation	241
0.1595% Olea Europaea (Olive) Fruit Oil in a scalp conditioner/hair wax	104	HRIPT; occlusive; applied neat	not a dermal irritant or sensitizer	222
0.7% Olea Europaea (Olive) Fruit Oil in a scalp conditioner	110	HRIPT; occlusive; formulation diluted to 1%	not a dermal irritant or sensitizer	241
1.6% Olea Europaea (Olive) Fruit Oil in a body lotion	110	HRIPT with 0.02 ml test material , occluded	1 subject had slight erythema following the 7th patch that did not reoccur, no other reactions observed. Not a dermal irritant or sensitizer.	288
10% Olea Europaea (Olive) Fruit Oil in a skin salve	209	HRIPT; occlusive applied neat	not a sensitizer	226
22% Olea Europaea (Olive) Fruit Oil in a body moisturizer	105	HRIPT, semi-occluded	not a dermal irritant or sensitizer	289
58.7% Olea Europaea (Olive) Fruit Oil in a conditioning hair oil	102	HRIPT with 0.2 ml, semi-occluded	not a dermal irritant or sensitizer	290
69.6% Olea Europaea (Olive) Fruit Oil in a foundation	209	HRIPT with 200 µl test material, occluded	not a dermal irritant or sensitizer	291
10% Olea Europaea (Olive) Oil in a skin salve	51	4-wk use test; applied to lips, hands/nails, elbows, knees, feet/heels	did not elicit significant dermal irritation or dryness; 2 subjects had level 1(mild, very slight erythema on the lips, and 5 had level 1 erythema on the elbows, lips, or knees; 15 subjects reported subjective irritation	227
Olea Europaea (Olive) Oil Unsaponfiables				
2.5% Olea Europaea (Olive) Oil Unsaponfiables in a bath body mist	107	HRIPT with 150 µl test material, semi-occluded	not a dermal irritant or sensitizer	292

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
Hydrogenated Olive Oil				
12% Hydrogenated Olive Oil in a lipstick	108	HRIPT, occluded	not a dermal irritant or sensitizer	274
Hydrogenated Olive Oil Unsaponifiables				
2% Hydrogenated Olive Oil Unsaponifiables in a face and neck product	50	HRIPT, occluded	not a dermal irritant or sensitizer	273
Hydrogenated Olive Oil Unsaponifiables				
5% Hydrogenated Olive Oil Unsaponifiables in a skin cleansing product	57	HRIPT, semi-occluded, 10% dilution of product	not a dermal irritant or sensitizer	273
Sodium Olivate				
17.64% Sodium Olivate in a body bar soap	107	HRIPT, semi-occluded	not a dermal irritant or sensitizer	293
Orbignya Oleifera Seed Oil				
3.79% Orbignya Oleifera Seed Oil in a cream cleanser	104	HRIPT with 0.2 ml of a 10% dilution of formulation, semi-occluded	not a dermal irritant or sensitizer	294
Orbignya Speciosa Kernel Oil				
0.4125% Orbignya Speciosa Kernel Oil in a hair conditioner	104	modified HRIPT; semi-occlusive; 10% dilution in distilled water	not a dermal irritant or sensitizer	295
Oryza Sativa (Rice) Bran Oil				
Rice is generally regarded as hypoallergenic, although some case studies of allergic reactions to raw rice have been reported. In clinical testing, formulations containing 1.04-8.0% Oryza Sativa (Rice) Bran Oil were not irritating or sensitizing. . Hydrolyzed rice protein was not irritating to human subjects.				28
Persea Gratissima (Avocado) Oil				
Persea Gratissima (Avocado) Oil was not an irritant or sensitizer when human subjects were patch tested with cosmetic formulations containing up to 10.7% Persea Gratissima (Avocado) Oil or in patch tests using 100% Persea Gratissima (Avocado) Oil.				31
0.2% Persea Gratissima (Avocado) Oil in a scalp conditioner	114	primary cutaneous irritation; formulation diluted to 1%	no primary irritation	241
0.2% Persea Gratissima (Avocado) Oil in a scalp conditioner	110	HRIPT; occlusive; formulation diluted to 1%	not a dermal irritant or sensitizer	241
10% Persea Gratissima (Avocado) Oil in a skin salve	51	4-wk use test; applied to lips, hands/nails, elbows, knees, feet/heels	did not elicit significant dermal irritation or dryness; 2 subjects had level 1(mild, very slight erythema on the lips, and 5 had level 1 erythema on the elbows, lips, or knees; 15 subjects reported subjective irritation	227
Plukenetia Volubilis Seed Oil				
0.51% Plukenetia Volubilis Seed Oil in a lipstick	108	HRIPT; occlusive; applied neat	not an irritant or a sensitizer	296
Prunus Amygdalus Dulcis (Sweet Almond) Oil				
Undiluted Prunus Amygdalus Dulcis (Sweet Almond) Oil was non-irritating in a single insult patch test with 101 subjects, and it was non-irritating and non-sensitizing in an HRIPT using 52 subjects. Cosmetic formulations containing 0.1-25% were practically non-irritating and non-sensitizing in HRIPTs performed with 6906 subjects. In the Lanman-Maibach 21-day Cumulative Irritancy Assay, a moisturizer containing 25% Prunus Amygdalus Dulcis (Sweet Almond) Oil had a total irritancy score of 14/630				218

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
7% Prunus Amygdalus Dulcis (Sweet Almond) Oil in an oil treatment	103	HRIPT with 200 µl test material, semi-occluded	Grade 1 (mild erythema) reactions in 4 subjects for 1 or 2 patches in the induction phase, grade 1 (mild erythema in different subjects at the 48 h challenge reading. Study concluded test material was not a dermal irritant or sensitizer.	257
10% Prunus Amygdalus Dulcis (Sweet Almond) Oil in a face serum	108	primary cutaneous irritation	no primary irritation	225
10% Prunus Amygdalus Dulcis (Sweet Almond) Oil in a face serum	108	HRIPT; occlusive; applied neat	not an irritant or a sensitizer	225
10% Prunus Amygdalus Dulcis (Sweet Almond) Oil in a skin salve	209	HRIPT; occlusive applied neat	not a sensitizer	226
10% Prunus Amygdalus Dulcis (Sweet Almond) Oil in a skin salve	51	4-wk use test; applied to lips, hands/nails, elbows, knees, feet/heels	did not elicit significant dermal irritation or dryness; 2 subjects had level 1(mild, very slight erythema on the lips, and 5 had level 1 erythema on the elbows, lips, or knees; 15 subjects reported subjective irritation	227
15% Prunus Amygdalus Dulcis (Sweet Almond) Oil in a massage oil	107	HRIPT with 0.2 ml test material, semi-occluded	1 subject had slight erythema following the 7th patch that did not reoccur, no other reactions observed. Not a dermal irritant or sensitizer.	262
25% Prunus Amygdalus Dulcis (Sweet Almond) Oil in a lip balm	222	HRIPT with 0.2 g test material, occluded	2 subjects had low-level, transient (±) reactions during the induction, no other reactions were observed. Study concluded that test material was not a dermal sensitizer.	267
~31% Prunus Amygdalus Dulcis (Sweet Almond) Oil in a facial oil	108	modified HRIPT; semi-occlusive; applied neat	not a dermal irritant or sensitizer	297
45.25% Prunus Amygdalus Dulcis (Sweet Almond) Oil in a facial oil	109	HRIPT; semi-occlusive; applied neat	not a dermal irritant or sensitizer	298
46% Prunus Amygdalus Dulcis (Sweet Almond) Oil in a cuticle softener	106	modified Draize assay with an induction phase (3x/wk for 10 applications) and a challenge phase, applied neat, occlusive	not a dermal irritant or sensitizer	299
Prunus Armeniaca (Apricot) Kernel Oil				
2% Prunus Armeniaca (Apricot) Kernel Oil in a face cream	51	HRIPT with 20 µl test material, occluded	not a dermal irritant or sensitizer	243
2% Prunus Armeniaca (Apricot) Kernel Oil in an eye cream	108	HRIPT with 20 µl test material, occluded	not a dermal irritant or sensitizer	244
2.5% Prunus Armeniaca (Apricot) Kernel Oil in a cream	119	primary cutaneous irritation	no primary irritation	242
19.749% Prunus Armeniaca (Apricot) Kernel Oil in a face serum	108	primary cutaneous irritation	no primary irritation	225
0.005% Prunus Armeniaca (Apricot) Kernel Oil in a scalp conditioner/hair wax	104	HRIPT; occlusive; applied neat	not a dermal irritant or sensitizer	222
1% Prunus Armeniaca (Apricot) Kernel Oil in a cream	57	HRIPT; Finn chambers, applied neat	not a dermal irritant or sensitizer	277

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
2.5% Prunus Armeniaca (Apricot) Kernel Oil in a cream	118 (irritation)/ 116 (sensitization)	HRIPT; occlusive	not a dermal irritant or a sensitizer	242
19.749% Prunus Armeniaca (Apricot) Kernel Oil in a face serum	108	HRIPT; occlusive; applied neat	not an irritant or a sensitizer	225
Prunus Domestica Seed Oil				
0.04% Prunus Domestica Seed Oil in a preshave lotion	105	HRIPT with 0.2 ml, occluded	not a sensitizer	300
Prunus Persica (Peach) Kernel Oil				
24% Prunus Persica (Peach) Kernel Oil in a lip balm	222	HRIPT with 0.2 g test material, occluded	2 subjects had low-level, transient (±) reactions during the induction, no other reactions were observed. Study concluded that test material was not a dermal sensitizer.	267
Ribes Nigrum (Black Currant) Seed Oil				
0.1% Ribes Nigrum (Black Currant) Oil in a scalp conditioner	114	primary cutaneous irritation; diluted to 1%	no primary irritation	241
0.25% Ribes Nigrum (Black Currant) Oil in a cream	119	primary cutaneous irritation	no primary irritation	242
0.1% Ribes Nigrum (Black Currant) Oil in a scalp conditioner	110	HRIPT; occlusive; diluted to 1%	not a dermal irritant or sensitizer	241
0.2% Ribes Nigrum (Black Currant) Seed Oil is an eye mask	228	HRIPT, occluded	4 subjects had "?" or "+" reaction during induction that were not considered clinically relevant, no other reactions observed. Not sensitizing	301
0.2% Ribes Nigrum (Black Currant) Oil in a skin cream	106	HRIPT, occlusive	not a dermal irritant or sensitizer	276
0.25% Ribes Nigrum (Black Currant) Oil in a cream	118 (irritation)/ 116 (sensitization)	HRIPT; occlusive	not a dermal irritant or a sensitizer	242
0.2% Ribes Nigrum (Black Currant) Seed Oil is an eye mask	195	4-week safety in-use study	No adverse reactions reported. Product considered suitable for sensitive skin.	302
Rosa Canina Fruit Oil				
0.39% Rosa Canina Fruit Oil in a skin cream	108	primary cutaneous irritation	no primary irritation	276
0.39% Rosa Canina Fruit Oil in a skin cream	106	HRIPT, occlusive	not a dermal irritant or sensitizer	276
Rubus Chamaemorus Seed Oil				
2.5% Rubus Chamaemorus Seed Oil in product	10	Single occlusive patch test for 48 h with 25 µl	not an irritant	303
Rubus Idaeus (Raspberry) Seed Oil				
5% Rubus Idaeus (Raspberry) Seed Oil in a face and neck product	102	HRIPT, occluded	not a dermal irritant or sensitizer	273

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
Sesamum Indicum (Sesame) Seed Oil				
In clinical testing, undiluted Sesamum Indicum (Sesame) Seed Oil was not irritating. Cosmetic formulations containing 8-14.3% Sesamum Indicum (Sesame) Seed Oil were non- to essentially non-irritating. Prophetic patch testing with formulations containing 10-11% Sesamum Indicum (Sesame) Seed Oil were not irritating with or without UV light. Patients with contact allergy to Sesamum Indicum (Sesame) Seed Oil were patch tested, and most had positive reactions to sesamol, sesamin, and sesamolin.				55
25% Sesamum Indicum (Sesame) Seed Oil in a face serum	108	primary cutaneous irritation	no primary irritation	225
8% Sesamum Indicum (Sesame) Seed Oil in a skin salve	209	HRIPT; occlusive applied neat	not a sensitizer	226
25% Sesamum Indicum (Sesame) Seed Oil in a face serum	108	HRIPT; occlusive; applied neat	not an irritant or a sensitizer	225
8% Sesamum Indicum (Sesame) Seed Oil in a skin salve	51	4-wk use test; applied to lips, hands/nails, elbows, knees, feet/heels	did not elicit significant dermal irritation or dryness; 2 subjects had level 1(mild, very slight erythema on the lips, and 5 had level 1 erythema on the elbows, lips, or knees; 15 subjects reported subjective irritation	227
Solanum Lycopersicum (Tomato) Seed Oil				
0.0023% Solanum Lycopersicum (Tomato) Seed Oil in a cream cleanser	104	HRIPT with 0.2 ml of a 10% dilution of the formulation, semi-occluded	not a dermal irritant or sensitizer	304
Theobroma Cacao (Cocoa) Seed Butter				
50.1% Theobroma Cacao (Cocoa) Seed Butter in a lip balm	106	HRIPT with 150 µl test material, semi-occluded	not a dermal irritant or sensitizer	305
Theobroma Grandiflorum Seed Butter[306]				
5% Theobroma Grandiflorum Seed Butter in a lip balm	106	HRIPT with 150 µl test material, semi-occluded	not a dermal irritant or sensitizer	307
Triticum Vulgare (Wheat) Germ Oil				
In clinical testing, Triticum Vulgare (Wheat) Germ Oil was not an irritant or a sensitizer				30
0.005% Triticum Vulgare (Wheat) Germ Oil in a scalp conditioner/hair wax	104	HRIPT; occlusive; applied neat	not a dermal irritant or sensitizer	222
Vaccinium Macrocarpon (Cranberry) Seed Oil				
0.04% Vaccinium Macrocarpon (Cranberry) Seed Oil in a face and neck product	53	HRIPT, occluded	not a dermal irritant or sensitizer	273
Vaccinium Myrtillus Seed Oil				
~1% Vaccinium Myrtillus Seed Oil in a facial oil	116	modified HRIPT; semi-occlusive; volatilized	not a dermal irritant or sensitizer	306
Vaccinium Vitis-Idaea Seed Oil				
5% Vaccinium Vitis-Idaea Seed Oil in product	10	Single occlusive patch test of 48 h with 0.02 ml	not an irritant	308
Vegetable Oil				
4% Vegetable Oil in a foundation	115	HRIPT, semi-occluded	1 subject had ± on the first day of the induction only, no other reactions. Not a dermal irritant or sensitizer.	309
4% Vegetable Oil in a lipstick	106	HRIPT with 0.2 g, occluded	not a dermal irritant or sensitizer	310

Table 8. Dermal effects – Human studies

Ingredient and Concentration	Subjects Completed	Method	Results	Reference
11% Vegetable Oil in an eye shadow	106	HRIPT, semi-occluded	not a dermal irritant or sensitizer	311
		Vitis Vinifera (Grape) Seed Oil		
39% Vitis Vinifera (Grape)Seed Oil in a preshave lotion	105	HRIPT with 0.2 ml, occluded	not a sensitizer	300
90% Vitis Vinifera (Grape) Seed Oil in a fragranced oil	105	HRIPT; semi-occluded; applied neat	not a dermal irritant or sensitizer	312
0.5% Hydrogenated Grapeseed Oil in a lip product	53	HRIPT; semi-occluded	not a dermal irritant or sensitizer	313
		Zea Mays (Corn) Germ Oil		
20% Zea Mays (Corn) Germ Oil in a cleansing oil rinse-off	214	HRIPT with 0.2 ml of a 10% v/v aqueous solution, semi-occluded	3 subjects had a "?" reaction following a patch during the induction and 1 subject had definite erythema with no edema or damage to the epidermis (+D) following the 7th patch. No reactions were observed at a new test site. No other reactions were observed. Study concluded test material was not a dermal sensitizer.	261
		PHOTOTOXICITY/PHOTOSENSITIZATION		
		Cocos Nucifera (Coconut) Oil		
Bar soaps made with 13% Cocos Nucifera (Coconut) Oil, tested as a 3% aqueous solution, tested using 10 subjects, and a similar soap, prepared as 1 or 3% aqueous solutions, tested on 52 panelists, did not produce any evidence of photosensitization.				33
		Sodium Cocoate		
Bar soaps 13% sodium cocoate, prepared as a 3% aqueous solution, tested using 10 subjects did not produce any evidence of photosensitization.				33
		Prunus Amygdalus Dulcis (Sweet Almond) Oil		
Formulations containing 0.1% - 2.0% Prunus Amygdalus Dulcis (Sweet Almond) Oil, tested for photosensitization in a total of 764 subjects, did not manifest photosensitivity in any of the test subjects.				218
		Oryza Sativa (Rice) Bran Oil		
Formulations containing 1.04% Oryza Sativa (Rice) Bran Oil were not photosensitizing.				*28*
		COMEDOGENICITY		
		Ribes Nigrum (Black Currant) Seed Oil		
0.2% Ribes Nigrum (Black Currant) Seed Oil in an eye mask formulation	6	applied undiluted; occlusive	avg. score of 0.00 comedones/cm^2; non-comedogenic	314

[a] Same 109 panelists tested these 4 formulations hat differed only in color and fragrance.

Table 9. Ocular irritation – Non-Human and Human

Ingredient	Concentration	Test Group	Procedure	Results	Reference
NON-HUMAN					
Adansonia Digitata Seed Oil					
baobab oil	100%		MatTek EpiOcular MTT viability assay; 100 µl of test material for 16-256 min	non-irritating	212
Aleurites Moluccana Seed Oil					
Aleurites Moluccana oil			Draize test	not an ocular irritant	315
Aleurites Moluccana oil			in vitro conjunctival cell assay	not cytotoxic	315
Aleurites Moluccana oil			ocular burn treatment efficacy test	no adverse effects	316
Butyrospermum Parkii (Shea) Butter					
Butyrospermum Parkii (Shea) Butter	undiluted	3 male Kleinrussen Chbb:HM rabbits	0.1 ml instilled into the conjunctival sac of one eye for 24 h	not irritating; mild conjunctival reactions	317
Cocos Nucifera (Coconut) Oil					
Undiluted Cocos Nucifera (Coconut) Oil, instilled into rabbit eyes without rinsing, produced minimal eye irritation					33
Hydrogenated Coconut Oil					
Undiluted hydrogenated coconut oil produced mild irritation in one study, minimal irritation in another, negligible or minimal irritation in eight additional tests. Two lipstick formulations containing 10% hydrogenated coconut oil both produced slight conjunctivitis.					33
Coconut Acid					
Undiluted coconut acid produced mild irritation in rabbit eyes in two studies and minimal irritation in a third.					33
Crambe Abyssinica Seed Oil					
Crambe Abyssinica Seed Oil	undiluted		details not provided	an ocular irritant, but not corrosive	215
Elaeis Guineensis (Palm) Oil					
Undiluted Elaeis Guineensis (Palm) Oil and cosmetic lotions and creams containing 1.5-2.0% Elaeis Guineensis (Palm) Oil were minimally irritating to the eyes of rabbits, while one lotion containing 1.5% Elaeis Guineensis (Palm) Oil was moderately irritating.					26
Hydrogenated Palm Oil					
Hydrogenated palm oil suppositories were mildly irritating to rabbit eyes.					26
Fragaria Ananassa (Strawberry) Seed Oil					
Fragaria Ananassa (Strawberry) Seed Oil	5-50% in a lipophilic solvent		neutral red release test	IC_{50} >50%; negligible cytotoxicity	318
Hydrogenated Cottonseed Oil					
Cosmetic formulations containing 3.4-12.3% hydrogenated cottonseed oil were mildly irritating to the eyes of rabbits					27
Hippophae Rhamnoides Seed Oil					
Hippophae Rhamnoides Seed Oil	5-50% in a lipophilic solvent		neutral red release test	IC_{50} >50%; negligible cytotoxicity	319
Linum Usitatissimum (Linseed) Seed Oil					
mascara containing 9.4% Linum Usitatissimum (Linseed) Oil	diluted at 0-50% in mineral oil		neutral red release test	NR_{50}>50%; slightly cytotoxic	320

Table 9. Ocular irritation – Non-Human and Human

Ingredient	Concentration	Test Group	Procedure	Results	Reference
mascara containing 9.4% Linum Usitatissimum (Linseed) Oil	67.1% solution in mineral oil		hen's egg test-chorioallantoic membrane assay (HET-CAM)	moderately irritating	320
mascara containing 9.4% Linum Usitatissimum (Linseed) Oil	66.9% solution in mineral oil		reconstituted epithelial culture assay	slightly cytotoxic	320
Olea Europaea (Olive) Fruit Oil					
Olea Europaea (Olive) Fruit Oil, "high purity"	undiluted	rabbits; number not specified	Draize test	not irritating	315
Olea Europaea (Olive) Fruit Oil, "high purity"			in vitro study using human conjunctival epithelial cells	did not induce cellular necrosis or apoptosis	315
Oryza Sativa (Rice) Bran Oil					
A mixture of Oryza Sativa (Rice) Bran Oil and Oryza Sativa (Rice) Germ Oil, concentrations not stated, were not irritating to rabbit eyes. Undiluted Oryza Sativa (Rice) Bran Oil was considered minimally irritating.					28
Oryza Sativa (Rice) Germ Oil					
Oryza Sativa (Rice) Germ Oil, concentration not stated, was not a primary irritant.					28
Prunus Amygdalus Dulcis (Sweet Almond) Oil					
The ocular irritation potential of undiluted Prunus Amygdalus Dulcis (Sweet Almond) Oil and cosmetic formulations containing up to 25% Prunus Amygdalus Dulcis (Sweet Almond) Oil were evaluated using rabbits. Undiluted Prunus Amygdalus Dulcis (Sweet Almond) Oil was practically nonirritating or minimally irritating, and formulations containing up to 25% Prunus Amygdalus Dulcis (Sweet Almond) Oil were nonirritating to minimally irritating. In most instances, reactions that occurred were limited to conjunctival irritation, which cleared by the third day of observation.					218
Ribes Nigrum (Black Currant) Seed Oil					
eye mask containing 0.2% Black Ribes (Black Currant) Seed Oil	50% dilution		HET-CAM assay	practically no irritation	321
Rubus Chamaemorus Seed Oil					
product containing 2.5% Rubus Chamaemorus Seed Oil			neutral red release assay	negligible cytotoxicity; product was considered well tolerated	322
Sesame Indicum (Sesame) Seed Oil					
Undiluted Sesamum Indicum (Sesame) Seed Oil was non- to minimally irritating to rabbit eyes, and a lipstick containing 10-11% Sesamum Indicum (Sesame) Seed Oil was not an ocular irritant.					55
Triticum Vulgare (Wheat) Germ Oil					
Undiluted Triticum Vulgare (Wheat) Germ Oil was, at most, a minimal ocular irritant, and 2% in a water emulsion was not irritating.					30
Vaccinium Vitis-Idaea Seed Oil					
Vaccinium Vitis-Idaea Seed Oil	5-50% in a lipophilic solvent		neutral red release test	IC_{50}> 50%; negligible cytotoxicity	323
Zea Mays (Corn) Oil					
Zea Mays (Corn) Oil, "high purity"	undiluted	rabbits, number not specified	Draize test	not irritating	315
Zea Mays (Corn) Oil, "high purity"			in vitro study using human conjunctival epithelial cells	did not induce necrosis or apoptosis	315

Table 9. Ocular irritation – Non-Human and Human

Ingredient	Concentration	Test Group	Procedure	Results	Reference
HUMAN STUDIES					
Linum Usitatissimum (Linseed) Seed Oil					
9.4% Linum Usitatissimum (Linseed) Seed Oil in a mascara		33 female subjects	4 wk study; 16 wore contact lenses, 17 had "sensitive" eyes	no subjective irritation and no adverse reports; clinically safe for use by contact lens-wearers	324
Ribes Nigrum (Black Currant) Seed Oil					
0.2% Ribes Nigrum (Black Currant) Seed Oil	undiluted	52 subjects	4-wk in-use study	no adverse reactions; safe for contact-lens wearers	325

Table 10. Clinical Trials/Case Studies

Ingredient	Patients/Condition	Effect/Observation	Reference
Aleurites Moluccana Seed Oil			
Aleurites Moluccana oil	15; mild, stable plaque psoriasis	efficacy study "just enough (oil) to moisten the plaque" was applied 3 x daily for 12 wks; no side effects or adverse events were reported.	326
Anacardium Occidentale (Cashew) Seed Oil			
Anacardium Occidentale (Cashew) Seed Oil	37-year-old male resin researcher	presentation of bullae on his right leg after dropping pure oil from a bottle on his right thigh; skin was thoroughly washed immediately; erythema developed 10 days after exposure Patch testing was performed with cashew nut oil 3% alcohol, cashew nut oil 0.3% alcohol, cashew nut oil 0.03% alcohol, and urushiol 0.01% petrolatum.; a "+" reaction was reported on day 2 and "++" reactions on days 3 and 4 to the 3% dilution,; a "+" reactions to the 0.3% dilution and urushiol was reported on days 2-4; a "?+" reaction was observed on days 2 and 3 and a "+" reaction was observed on day 4 to the 0.03% dilution	327
Cocos Nucifera (Coconut) Oil			
Cocos Nucifera (Coconut) Oil did not produce adverse effects in several therapeutic studies			33
Glycine Soja (Soybean) Oil			
Glycine Soja (Soybean) Oil	7; history of immediate hypersensitivity reaction after the ingestion of soybeans	a double-blind crossover study; the patients were first skin tested by the puncture method with a crude whole soybean extract, a partially hydrogenated oil, a non-hydrogenated oil, and a cold-pressed soybean oil; olive oil from a retailer was used as a negative control. Since all 7 patients had negative skin tests to the oils and positive reactions to the crude soybean extract, they were challenged orally with capsules of each of the oils in random order on 4 separate days. None of the patients reacted to the oral challenges; the researchers remarked that while a reaction to the cold-pressed soybean oil did not occur in this study, cold-pressed oils may contain soybean protein and should be avoided	67
soy oil proteins	4; known allergy to soybean	Sera was used to examine the allergenicity; neither the IgE nor the IgG_4 in the sera reacted to protein in the soy oil	23
Helianthus Annuus (Sunflower) Oil			
refined and cold-pressed sunflower oils	patients had anaphylactic reactions following ingestion of sunflower seeds	no reactions were seen upon oral or open challenge with refined or cold-pressed sunflower oils, both of which were shown to contain detectable amounts of protein.	18
	1 woman; desensitized to mugwort (of the Compositae family) pollen for a yr, then had an anaphylactic reaction to sunflower (also of the Compositae family) seeds	a delayed positive reaction to sunflower oil in a skin prick test was discovered; prick test results with 10 control subjects were negative. In an oral challenge test, a delayed reaction was again observed, with symptoms occurring 2.25-8 h after administration.	328
Macadamia Seed Oil			
Macadamia Seed Oil in a lipstick (species description or concentration were not reported)	28-year-old woman; chelitis	Chelitis case reported after lipstick use; patient was patch tested with ingredients contained in the lipstick, Positive reactions to diisostearyl malate and Macadamia Seed Oil were reported; the condition . improved after discontinuing use of lipsticks containing these 2 ingredients	329
Olea Europaea (Olive) Fruit Oil			
Throughout the literature, it is stated that sensitization to Olea Europaea (Olive) Fruit Oil is considered rare. Case reports have been described, however, and generally involved patients with venous eczema, some type of dermatitis or lesion, or an occupational exposure. Patch testing with Olea Europaea (Olive) Fruit Oil produced positive reactions in most of these cases, and these results were usually regarded as allergenic. The concentrations of Olea Europaea (Olive) Fruit Oil tested were not always given, but when stated, test concentrations giving positive results, ranged from 30-100%. When the constituents of olive oil were tested as well, the results of that testing were negative.			330-337
Whether the reactions to olive oil were contact sensitization or irritation were investigated using open and occlusive testing. It was concluded that olive oil presented as a weak irritant rather than a contact sensitizer in the few case studies observed.			338
Persea Gratissima (Avocado) Oil			
Persea Gratissima (Avocado) Oil	1 female; dermatitis around the eyes and earlobes	Patch testing with her sunscreen resulted in positive results. In subsequent patch testing of the individual ingredients, a positive reaction to undiluted oil, but not to the active ingredient, was observed; 20 controls subjects were used, and reactions to Persea Gratissima (Avocado) Oil were not seen	339

Table 10. Clinical Trials/Case Studies

Ingredient	Patients/Condition	Effect/Observation	Reference
Sesamum Indicum (Sesame) Seed Oil			
Sesamum Indicum (Sesame) Seed Oil in an ointment	female	Pruritic erythema, papules, and vesicles appeared after application of the ointment; patch testing was performed with the ointment and with the individual ingredients, including undiluted Sesamum Indicum (Sesame) Seed Oil Both the ointment and Sesamum Indicum (Sesame) Seed Oil produced positive reactions on days 2, 3, 4, and 1; the other components did not cause a reaction Results were negative in patch testing of Sesamum Indicum (Sesame) Seed Oil using 20 healthy subjects.	[340]

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Personal Care Products Council
Committed to Safety, Quality & Innovation

Memorandum

TO: F. Alan Andersen, Ph.D.
Director - COSMETIC INGREDIENT REVIEW (CIR)

FROM: John Bailey, Ph.D.
Industry Liaison to the CIR Expert Panel

DATE: January 20, 2011

SUBJECT: Comments on the Tentative Report on Plant-Derived Fatty Acid Oils as Used in Cosmetics

General comment - Somewhere in this report it would be helpful to state that the crude plant oils may contain many additional components depending on the species from which the ingredient is derived.

p.1 - It would be helpful if the Introduction would mention why it is appropriate to include the unsaponifiables in this report. Unsaponifiables are not mixtures of triglycerides containing fatty acids and fatty acid derivatives.

p.1 - The introduction indicates that *Orbignya oleifera* and *Orbignya speciosa* are two names for the same species. Composition information is included in the tentative report for *O. oleifera*, which should also cover the name *O. speciosa*. Therefore *O. speciosa* needs to be removed from the list of insufficient data ingredients. In addition, a memo providing composition information on *O. speciosa* (from a supplier selling the oil under the *O. speciosa* name) was provided to CIR on January 10, 2011.

p.1-2 - As there are many references available on oils and how composition affects physical/chemical properties, it would be helpful to note that more in depth discussions are available elsewhere and provide a few example references.

p.5 - As some of the oils in this report are not edible, please remove the word "edible" from the Non-Cosmetic Use section. It would be helpful if the regulatory status of Rapeseed Oil/Canola Oil found in the Code of Federal Regulations were added to this report. 21 CFR 184.1555 (http://www .accessdata.fda. govlscriptslcdrhlcfdocslcfcfrlCFRSearch .cfrn) limits the erucic acid content in low erucic acid rapeseed oil used in food to 2%. The Federal Register also states that low erucic acid rapeseed oil is not to be used in infant formula.

p.5 - In the Animal Toxicology section, it would also be helpful to note that for those oils that are edible, exposure to the oil from food use would result in a much larger systemic dose than the systemic dose resulting from use in cosmetic products.

p.7 - Please include the concentrations tested in the Mucosal Irritation section.

p.7, 8 - Please revised the following sentence. "Individuals who have food allergies to a plant protein rarely elicit allergic reactions when exposed to refined oils of the same plant." The subject of

this sentence is "Individuals", they may exhibit an allergic reaction, but they do not cause (elicit) the allergic reaction.

p.8 - In the Summary, it would be helpful to give the range of concentrations of the oils tested for irritation and sensitization.

p.8 - In the Summary, please provide the concentration of Corylus Avellana (Hazel) Seed Oil that was tested for comedogenicity.

p.8 - In the Summary, please provide what type of findings were reported in the case studies.

p.9 - It would be helpful if it was stated earlier in the report the reason why the CIR Expert Panel is concerned about arachidonic acid (other than it has an CIR insufficient data conclusion). Arachidonic acid is used as a model for dermal inflammation. Direct application of arachidonic acid to the ears of mice results in inflammation. It should also be noted that the arachidonic acid in the plant oils is primarily part of triglycerides, not free arachidonic acid. It is free arachidonic acid that results in a dermal inflammatory response.

p.9 - Publically available fatty acid composition data has been identified for the following ingredients in the list of insufficient data ingredients. This information needs to be added to the report and the Discussion and Conclusion need to be changed to reflect the information about these ingredients. Orbignya Speciosa Kernel Oil should be considered safe for use as it an alternate name for Orbignya Oleifera Seed Oil.

Actium Lappa Seed Oil

Wang C, Zhang X, Li F. 2002. Analysis of fatty acid in Arctium lappa L. seed oil by GC-MS. Journal of Plant Resources and Environment 11(4): 58-59. [Chinese language]

See attached for the English abstract and a translation of the fatty acid composition table.

Citrus Paradisi (Grapefruit) Seed Oil

Waheed A, Mahmud S, Saleem M, Ahmad T. 2009. Fatty acid composition of neutral lipid: Classes of Citrus seed oil. Journal of Saudi Chemical Society 13: 269-272.

See attached paper

Coix Lacryma-Jobi (Job's Tears) Seed Oil

http://plants.jstor.org/upwta/2_430 gives the following information for the fatty acid composition of this oil "The seed-oil is recorded as a mixture of: oleic acid, 53%; linoleic acid, 30.5%; palmitic acid, 16.0% and traces of stearic and linolenic acids." cited to Busson 1965.

Several other websites including this one
http://database.prota.org/PROTAhtml/Coix%20lacryma-jobi_En.htm indicates that Busson 1965 is the following French language book

Busson, F. 1965. Plantes alimentaires de l' Ouest Africain: Etude botanique, biologique et chimique. Marseille: Ministere de la Cooperation.

According to the National Agricultural Library website, this book is available at their facility.

Lycium Barbarum Seed Oil

See memo provided to CIR on January 18, 2011 for fatty acid composition information

Morinda Citrifolia Seed Oil

West BJ, Jenson, CJ, Westerndorf, J. 2008. A new vegetable oil from noni (Morinda citrifolia) seeds. International Journal of Food Science and Technology 43(11): 1988-1992.

Abstract

The nutritional quality and safety of oil extracted from noni (Morinda citrifolia) seeds was evaluated to determine its potential as a useful vegetable oil. The average oil content of noni seeds was found to be 124.9 g/kg. The mean linoleic acid content of crude noni seed oil was 59.4%. The average β-sitosterol, campesterol, stigmasterol, and α-tocopherol contents of noni seed oil were 4310, 2195, 2020, and 382 mg/kg, respectively. No evidence of acute oral toxicity was observed for noni seed or the oil at 5 g/kg b.w. and 10 mL/kg b.w., respectively. Noni seed oil was not gentoxic in the *Salmonella typhimurium* reverse mutation assay or the in vitro mammalian chromosomal aberration assay. These results indicate that noni seeds may be a useful new source of vegetable oil.

Chunhieng T, Hay L, Montet. 2005. Detailed study of the juice composition of noni (*Morinda citrifolia*) fruits from Cambodia. Fruits 60(1): 13-24.

Abstract

Introduction. Noni (*Morinda citrifolia*) has a long history related to medical uses in Southeast Asian countries. Today, noni grows in the majority of the southern Pacific areas, in India, the Caribbean, South America and the West Indies. One of the challenges of recent years was to process *Morinda citrifolia* fruit juice, to make a more modern drug from a traditional product. In order to obtain better understanding of the medicinal characteristics of the noni fruit cultivated in Cambodia, the biochemical and mineral compositions of the raw juice extracted from *M. citrifolia* fruits were determined. Materials and methods. Whole fresh fruits of *M. citrifolia* which came to France from Cambodia were preserved at -20 °C during the duration of the experimentation. Commercial Tahitian noni juice was bought pasteurized to be used as a reference. The extraction was carried out on two batches of Cambodian fruits using a hydraulic press. Contents in oil, fatty acids, proteins, amino-acids, sugars and minerals of juices were analyzed. Results. Composition of noni juice of different origin was determined, compared, and discussed in relation to the biochemical and mineral composition of other vegetable oils. Conclusion. The biochemical composition of the noni juice, which showed a high content of antioxidant molecules, is not sufficient to explain the famous medicinal effects of noni juice. Certain molecules, in particular alkaloids, still have to be studied.

Schinziophyton Rautanenii Kernel Oil

This article (the abstract at http://www.actahort.org/books/756/756_43.htm) addresses the composition of this oil

ISHS Acta Horticulturae 756: International Symposium on Medicinal and Nutraceutical Plants

MUNGONGO COLD PRESSED OIL (SCHINZIOPHYTON RAUTANENII): A NEW NATURAL PRODUCT WITH POTENTIAL COSMETIC APPLICATIONS

Authors: H.R. Juliani, A.R. Koroch, J.E. Simon, C. Wamulwange

Keywords: manketi, fatty acid, seed oil, chemical composition, quality control

Abstract

Mungongo tree (*Schinziophyton rautanenii*, Euphorbiaceae) occurs naturally in Southern and Western Zambia, where it is locally known as mungongo and is called manketi in Angola, Namibia, Botswana, western Zimbabwe and northern Mozambique. Mungongo is a deciduous short-boled tree reaching 15 m in height. The edible oil which is extracted from mungongo seeds is used locally in cooking, food preparation and personal care products. The seed oil has applications in modern cosmetics and personal care products due to its healing and nurturing properties, such as a body rub during dry winter months or as a skin cleanser and moisturizer. The objective of this paper was to study the chemistry and quality of mungongo seed oil from Zambia, and explore potential new uses and applications of this 'new oil' for the cosmetic industry. The edible oil is expressed by cold pressure from seeds. According to the extraction method and efficiency of unit employed, yields of 28% of oil (traditional hand press) to 38% of oil (hydraulic press) can be achieved. Mungongo seed oils from Zambian samples showed a light yellow oil, with the refractive index of 1.4830, acid values 1.6%, the peroxide value 10 (mg/kg), and the solidification point of -7°C, suggesting that this oil is rich in unsaturated fatty acids. Mungongo seed oil composition showed that these oils were rich in elaeostearic acid (18:3) (25%), linoleic acid (18:2) (37%), oleic acid (18:1) (15%), palmitic and stearic acid (18:0) (8-9%, respectively). In Zambia alone, the estimated production of about 3000 MT of seed would yield around 840 MT of oil. This would represent a modest product supply for a niche oil product and simultaneously have a high impact for the local and regional communities. As the land where the Mungongo trees are indigenous is not suitable for agricultural exploitation and all the nuts are collected from the wild, the development of additional uses and external markets for this under-recognized oilseed could benefit the rural communities and provide a new export product from Africa and a new ingredient for the global cosmetic industry.

p.9 - Citrus Grandis (Grapefruit) Seed Oil is missing from the list of safe ingredients in the conclusion.

p.10 - Please change Elaeis (Palm) Oil to Elaeis (Palm) Fruit Oil.

p.10, 53 - Please correct the spelling of "Genuina" to "Gevuina".

p.10, 15, 56, 72, 74 - Please correct the spelling of "Europea" (in olive fruit oil) to "Europaea".

p.11 - In the list of insufficient data ingredients, it would also be helpful to indicate (*) those ingredients not reported to be used.

p.21, Table 3 - To be consistent with the rest of the entries in this table, Hazel Seed Oil should be listed under Corylus.

p.25, Table 4 - Where is the footnote that goes with a in the title?

p.25-37, Table 4 - The presentation in the "Others" row when additional identity information is not know is not consistent.

p.34, Table 4 - It would be helpful to have more detailed information on the fatty acid composition of Prunus Armeniaca (Apricot) Kernel Oil in this report. This information may be in the following references.

Abd El-Aal MH, Khalil MKM, Rahma EH. 1986. Apricot kernel oil: Characterization, chemical composition and utilization in some baked products. Food Chemistry 19(4): 287-298.

Abstract

Apricot kernel oil was extracted, characterized and evaluated for use in preparing biscuits and cake. The hexane-extracted oil fraction has a light yellow colour and is free from toxic material (hydrocyanic acid). The major fatty acids were oleic, linoleic and palmitic. Chloroform-methanol extracts consisted mainly of neutral lipids in which triglycerides were predominant components. The triglycerides consisted of six types of glycerides. Glycolipids and phospholipids were the minor fractions of the total lipids and their major constituents were acylsterylglycosides (62·3%) and phosphatidyl choline (72·2%), respectively.

Evaluation of the crude apricot kernel oil added to different types of biscuits and cake revealed that it has excellent properties and is comparable with corn oil at the same level. It did not affect the flavour, colour and texture of these products.

Jamieson GS, Mckinney RS. 1933. California apricot oil. Journal of the American Oil Chemists' Society. 10(8): 147-149.

Abstract

The characteristics and the percentages of the fatty acids present in apricot kernel oil as glycerides have been determined. The oil studied was found to contain about 90.6 per cent of unsaturated acids consisting of a mixture of oleic and linoleic acids. The saturated acids amounted to about 3.6 per cent and were composed almost entirely of palmitic and stearic acids.

Mention is made of the utilization of the press cake for the recovery of volatile oil, for fertilizer, and as a feed for livestock. An analysis of the press cake is given. A table of the smoking points for various fats and oils by the J. M. McCoy procedure is given for comparison with that of apricot kernel oil.

In addition to the established use of the oil by cosmetic manufacturers, other possible outlets include its use as a salad and cooking oil, for the roasting of shelled nuts, and for the manufacture of soap.

p.38-48, Table 5a - Please add "of ingredients not previously reviewed by CIR" to the title of this table.

p.40, Table 5a - Based on the Agricultural Research Database at http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl? it is likely that *Citrullus lanatus* and *Citrullus vulgaris* are two names for the same plant. Rather than a separate column for *C. vulgaris*, please footnote *C. lanatus* and indicate that one use of *C. vulgaris* was reported in the VCRP.

p.54, Table 6 - As this is not a comprehensive listing of non-cosmetic uses of the plant oils, please change the title to "Examples of non-cosmetic uses of oils. Why is only Anacardium Occidentale (Cashew) Seed Oil listed as a folk remedy? Borago Officinalis Seed Oil is listed in the first edition of the PDR for herbal medicine, so it could also be considered a "folk medicine" (or dietary supplement). What is meant by "pharmaceutical"? If this means use as an inactive in drugs, the FDA database of inactive drug ingredients (at http://www.accessdata.fda.gov/scripts/cder/iig/index.cfm) lists the following plant oil ingredients (found by searching the database for oil): almond oil, canola oil, corn oil, cottonseed oil, hydrogenated cottonseed oil, hydrogenated palm oil, soybean oil, hydrogenated soybean oil, olive oil, palm kernel oil, peanut oil, safflower oil, sesame oil, vegetable oil and hydrogenated vegetable oil.

p.55, Table 7. p.71, Table 9 - To be consistent with the other entries, please use the INCI name for baobab oil. Why is some information from old CIR report in italics, but other information from old CIR reports not in italics?

p.58-70, Table 8, p.71-73, Table 9 - The titles of these tables need to be changed to indicate that they also includes *in vitro* studies.

p.63, Table 8 - Under Hydrogenated Cottonseed Oil, what is meant by "mildly low"?

p.66, Table 8 - Please modify this table to indicate that *Orbignya oleifera* and *Orbignya speciosa* are two names for the same species.

p.68, Table 8 - There are two bolded headings for Ribes Nigrum (Black Currant) Seed Oil.

p.73, Table 9 - Under Linum Usitatissimum (Linseed) Seed Oil, please correct "w-wk stud;".

Personal Care Products Council
Committed to Safety, Quality & Innovation

Memorandum

TO: F. Alan Andersen, Ph.D.
Director - COSMETIC INGREDIENT REVIEW (CIR)

FROM: John Bailey, Ph.D. 1/10/11
Industry Liaison to the CIR Expert Panel

DATE: January 10, 2011

SUBJECT: Composition of Orbignya Speciosa Kernel Oil

A supplier reports the following fatty acid composition for Orbignya Speciosa Kernel Oil

C 8:0 Caprylic:	2 - 10%
C10:0 Capric:	2 - 12%
C12:0 Lauric:	35 - 50%
C14:0 Myristic:	12 - 25%
C16:0 Palmitic:	4 - 15%
C18:0 Stearic:	1 - 7%
C18:1 Oleic:	5 -20%
C18:2 Linoleic:	< 3%

Memorandum

TO: F. Alan Andersen, Ph.D.
Director - COSMETIC INGREDIENT REVIEW (CIR)

FROM: John Bailey, Ph.D.
Industry Liaison to the CIR Expert Panel

DATE: January 18, 2011

SUBJECT: Composition of Lycium Barbarum Seed Oil

A website concerning the benefits of *Lycium barbarum* (http://www.goji.co.za/n_seedoil.html) provides the following fatty acid composition for this oil.

Fatty Acid	**Content (%)**
Palm Acid	7.2
Stearic Acid	3
Oleic Acid	19.1
Linoleic	68.3
Linolenic	2.8
Arachidonic Acid	0.68

Composition of this oil may also be found in a recent Food Science and Technology Article, which can be purchased from Science Direct (found by searching Google for fatty acid composition of Lycium Barbarum seed oil).

Supercritical CO2 cell breaking extraction of Lycium barbarum seed oil and determination of its chemical composition by HPLC/APCI/MS and antioxidant activity

Li Guolianga, b, Shi Junyoua, b, 1, Suo Youruia, Sun Zhiweia, b, Xia Liana, b, Zheng Jiea, b, You Jinmaoa and Liu Yongjuna, ,

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Received 27 September 2009; revised 8 October 2010; accepted 13 October 2010. Available online

26 October 2010.

Abstract
The extraction parameters for oil extraction from Lycium barbarum seed including extraction pressure, temperature and time were optimized using an orthogonal test design. The optimum conditions for supercritical CO2 extraction were as follows: extraction pressure, 30 MPa; extraction temperature, 45 °C; dynamic extraction time, 60 min; CO2 flow, 25 kg/h. The oil yield under the conditions proposed was 19.28 g/100 g. The effect of cell wall breakage pretreatment was investigated by supercritical CO2 rapid depressurization, and results indicated this pretreatment could result in a rapid and efficient extraction. A sensitive fluorescent reagent 2-(11H-benzo[a]carbazol-11-yl) ethyl 4-methylbenzenesulfonate (BCETS) was utilized as pre-column labeling regent to determine fatty acids (FA) from Lycium barbarum seed oils obtained by different extraction methods. The main FA were: C18:2, C18:1, C16, C20:6, C18:3, and C20. The oil from L. barbarum seed exhibited excellent antioxidant activity in 2,2-diphenyl-1-picrylhydrazyl(DPPH)radical scavenging assay and ß-carotene bleaching test, and its antioxidant activity compared well with the references ascorbic acid and a-tocopherol.

Personal Care Products Council
Committed to Safety, Quality & Innovation

Memorandum

TO: F. Alan Andersen, Ph.D.
Director - COSMETIC INGREDIENT REVIEW (CIR)

FROM: John Bailey, Ph.D.
Industry Liaison to the CIR Expert Panel

DATE: January 20, 2011

SUBJECT: Updated Concentration of Use Information Plant Oils

The uses of Citrus Grandis (Grapefruit) Seed Oil have been removed as the companies reporting use of this ingredient are actually using an essential oil made from the peel.

1101 17th Street, N.W., Suite 300 | Washington, D.C. 20036-4702 | 202.331.1770 | 202.331.1969 (fax) | www.personalcarecouncil.org

Concentration of Use Minor Plant Seed Oils Mach 2010 Survey

Actinidia Chinensis (Kiwi) Seed Oil, Adansonia Digitata Oil, Adansonia Digitata Seed Oil, Hydrogenated Adansonia Digitata Seed Oil, Amaranthus Hypochondriacus Seed Oil, Arctium Lappa Seed Oil, Argania Spinosa Kernel Oil, Hydrogenated Argania Spinosa Kernel Oil, Astrocarym Murumuru Seed Butter, Sodium Astrocaryum Murumuruate, Avena Sativa (Oat) Kernel Oil, Borago Officinalis Seed Oil, Brassica Oleracea Italica (Broccoli) Seed Oil, Camelina Sativa Seed Oil, Hydrogenated Camelina Sativa Seed Oil, Camellia Oleifera Seed Oil, Hydrogenated Camellia Oleifera Seed Oil, Camellia Sinensis Seed Oil, Carica Papaya Seed Oil, Caryocar Brasiliense Fruit Oil, Chenopodium Quinoa Seed Oil, Citrullus Lanatus (Watermelon) Seed Oil, Citrus Aurantifolia (Lime) Seed Oil, Hydrogenated Lime Seed Oil, Hydrogenated Lime Seed Oil Unsaponifiables, Citrus Aurantium Dulcis (Orange) Seed Oil, Citrus Aurantium Dulcis (Orange) Seed Oil Unsaponifiables, Hydrogenated Orange Seed Oil, Hydrogenated Orange Seed Oil Unsaponifiables, Citrus Grandis (Grapefruit) Seed Oil, Citrus Grandis (Grapefruit) Seed Oil Unsaponifiables, Citrus Paradisi (Grapefruit) Seed Oil, Hydrogenated Grapefruit Seed Oil, Hydrogenated Grapefruit Seed Oil Unsaponifiables, Citrus Limon (Lemon) Seed Oil, Coix Lacryma-Jobi (Job's Tears) Seed Oil, Cucumis Sativus (Cucumber) Seed Oil, Cucurbita Pepo (Pumpkin) Seed Oil, Hydrogenated Pumpkin Seed Oil, Cynara Cardunculus Seed Oil, Euterpe Oleracea Fruit Oil, Fragaria Ananassa (Strawberry) Seed Oil, Fragaria Chiloensis (Strawberry) Seed Oil, Fragaria Vesca (Strawberry) Seed Oil, Fragaria Virginiana (Strawberry) Seed Oil, Guizotia Abyssinica Seed Oil, Irvingia Gabonensis Kernel Butter, Limnanthes Alba (Meadowfoam) Seed Oil, Hydrogenated Meadowfoam Seed Oil, Linum Usitatissimum (Linseed) Oil, Linseed Acid, Mangifera Indica (Mango) Seed Oil, Mangifera Indica (Mango) Seed Butter, Sodium Mangoseedate, Moringa Oleifera Seed Oil, Moringa Pterygosperma Seed Oil, Oenothera Biennis (Evening Primrose) Oil, Hydrogenated Evening Primrose Oil, Orbignya Oleifera Seed Oil, Babassu Acid, Potassium Babassuate, Sodium Babassuate, Perilla Ocymoides Seed Oil, Prunus Armeniaca (Apricot) Kernel Oil, Hydrogenated Apricot Kernel Oil, Hydrogenated Apricot Kernel Oil Unsaponifiables, Prunus Armeniaca (Apricot) Kernel Oil Unsaponifiables, Prunus Avium (Sweet Cherry) Seed Oil, Prunus Domestica Seed Oil, Prunus Persica (Peach) Kernel Oil, Hydrogenated Peach Kernel Oil, Pyrus Malus (Apple) Seed Oil, Ribes Nigrum (Black Currant) Seed Oil, Hydrogenated Black Currant Seed Oil, Ribes Rubrum (Currant) Seed Oil, Rubus Idaeus (Raspberry) Seed Oil, Hydrogenated Raspberry Seed Oil, Sclerocarya Birrea Seed Oil, Silybum Marianum Seed Oil, Solanum Lycopersicum (Tomato) Seed Oil, Solanum Lycopersicum (Tomato) Fruit Oil, Theobroma Cacao (Cocoa) Seed Butter, Sodium Cocoa Butterate, Theobroma Grandiflorum Seed Butter, Sodium Theobromoa Grandiflorum Seedate, Torreya Nucifera Seed Oil, Vaccinum Macrocarpon (Cranberry) Seed Oil, Hydrogenated Cranberry Seed Oil, Vitis Vinifera (Grape) Seed Oil, Sodium Grapeseedate, Hydrogenated Grapeseed Oil*

Ingredient	Product Category	Concentration of Use
Actinidia Chinensis (Kiwi) Seed Oil	Hair conditioners	0.1%
Actinidia Chinensis (Kiwi) Seed Oil	Shampoos (noncoloring)	0.1%
Adansonia Digitata Oil	Lipstick	0.01%
Argania Spinosa Kernel Oil	Bath oils, tablets, and salts	0.05%
Argania Spinosa Kernel Oil	Eyebrow pencil	0.1%
Argania Spinosa Kernel Oil	Eyeliner	0.1%
Argania Spinosa Kernel Oil	Eye shadow	0.2%
Argania Spinosa Kernel Oil	Eye lotion	1%
Argania Spinosa Kernel Oil	Mascara	0.1%
Argania Spinosa Kernel Oil	Hair conditioners	1%
Argania Spinosa Kernel Oil	Hair sprays (aerosol fixatives)	0.01%
Argania Spinosa Kernel Oil	Shampoos (noncoloring)	0.1%
Argania Spinosa Kernel Oil	Hair dyes and colors (all types requiring caution statement and patch test)	0.1%

Argania Spinosa Kernel Oil	Other hair coloring preparations	0.07%
Argania Spinosa Kernel Oil	Blushers (all types)	0.1%
Argania Spinosa Kernel Oil	Lipstick	0.1-1%
Argania Spinosa Kernel Oil	Nail polish and enamel	0.001-0.1%
Argania Spinosa Kernel Oil	Bath soaps and detergents	0.001-2%
Argania Spinosa Kernel Oil	Deodorants (underarm)	0.001%
Argania Spinosa Kernel Oil	Other personal cleanliness products	0.5%
Argania Spinosa Kernel Oil	Aftershave lotions	0.005%
Argania Spinosa Kernel Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.002%
Argania Spinosa Kernel Oil	Face and neck creams, lotions, and powders	0.5-3%
Argania Spinosa Kernel Oil	Body and hand creams, lotions, and powders	4-10%
Argania Spinosa Kernel Oil	Moisturizing creams, lotions and powders	0.04%
Argania Spinosa Kernel Oil	Night creams, lotions and powders	0.04-0.1%
Argania Spinosa Kernel Oil	Other skin care preparations	2-3%
Astrocaryum Murumuru Seed Butter	Eyeliner	0.06%
Astrocaryum Murumuru Seed Butter	Eye shadow	0.2%
Astrocaryum Murumuru Seed Butter	Eye lotion	0.5%
Astrocaryum Murumuru Seed Butter	Hair conditioners	0.001-0.2%
Astrocaryum Murumuru Seed Butter	Shampoos (noncoloring)	0.09%
Astrocaryum Murumuru Seed Butter	Tonics, dressings, and other hair grooming aids	0.2%
Astrocaryum Murumuru Seed Butter	Foundations	1%
Astrocaryum Murumuru Seed Butter	Lipstick	1-7%
Astrocaryum Murumuru Seed Butter	Other makeup preparations	0.001%
Astrocaryum Murumuru Seed Butter	Face and neck creams, lotions, and powders	1%
Astrocaryum Murumuru Seed Butter	Body and hand creams, lotions, and powders	0.1-0.2%
Astrocaryum Murumuru Seed Butter	Other skin care preparations	0.2%
Astrocaryum Murumuru Seed Butter	Indoor tanning preparations	0.1%
Astrocaryum Murumuru Seed Butter	Other suntan preparations	0.2%
Sodium Astrocaryum Murumuruate	Bath soaps and detergents	0.002%
Sodium Astrocaryum Murumuruate	Other shaving preparations products	0.005%
Sodium Astrocaryum Murumuruate	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.002%

Avena Sative (Oat) Kernel Oil	Baby lotions, oils, powders and creams	0.1%
Avena Sative (Oat) Kernel Oil	Other baby products	0.1%
Avena Sative (Oat) Kernel Oil	Eye lotion	0.2%
Avena Sative (Oat) Kernel Oil	Shampoos (noncoloring)	0.1%
Avena Sative (Oat) Kernel Oil	Lipstick	2%
Avena Sative (Oat) Kernel Oil	Bath soaps and detergents	0.01-0.1%
Avena Sative (Oat) Kernel Oil	Face and neck creams, lotions, and powders	0.5%
Avena Sative (Oat) Kernel Oil	Body and hand crams, lotions, and powders	0.1-3%
Avena Sative (Oat) Kernel Oil	Moisturizing creams, lotions and powders	0.1%
Avena Sative (Oat) Kernel Oil	Night creams, lotions and powders	0.1-0.5%
Borago Officinalis Seed Oil	Eye lotion	0.001-0.5%
Borago Officinalis Seed Oil	Tonics, dressings and other hair grooming aids	0.1%
Borago Officinalis Seed Oil	Lipstick	0.01%
Borago Officinalis Seed Oil	Bath soaps and detergents	0.001%
Borago Officinalis Seed Oil	Other personal cleanliness products	0.01%
Borago Officinalis Seed Oil	Preshave lotions (all types)	0.04%
Borago Officinalis Seed Oil	Shaving cream (aerosol, brushless, and lather)	0.5%
Borago Officinalis Seed Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.1%
Borago Officinalis Seed Oil	Face and neck creams, lotions and powders	1%
Borago Officinalis Seed Oil	Body and hand crams, lotions, and powders	0.05-1%
Borago Officinalis Seed Oil	Body and hand sprays	0.1%
Borago Officinalis Seed Oil	Moisturizing creams, lotions and powders	1%
Borago Officinalis Seed Oil	Night creams, lotions and powders	0.5%
Borago Officinalis Seed Oil	Other skin care preparations	0.5%
Borago Officinalis Seed Oil	Indoor tanning preparations	0.5%
Brassica Oleracea Italica (Broccoli) Seed Oil	Hair conditioners	0.5%
Brassica Oleracea Italica (Broccoli) Seed Oil	Shampoos (noncoloring)	0.001%
Brassica Oleracea Italica (Broccoli) Seed Oil	Tonics, dressings, and other hair grooming aids	3%
Camelina Sativa Seed Oil	Eye lotion	0.05%
Camelina Sativa Seed Oil	Hair conditioners	1%

Camelina Sativa Seed Oil	Lipstick	0.05-0.5%
Camelina Sativa Seed Oil	Skin Cleansing (cold creams, cleansing lotions, liquids and pads)	0.002%
Camelina Sativa Seed Oil	Face and neck creams, lotions, and powders	0.05-1%
Camelina Sativa Seed Oil	Body and hand crams, lotions, and powders	0.1-0.9%
Camelina Sativa Seed Oil	Moisturizing creams, lotions and powders	0.04%
Camelina Sativa Seed Oil	Night creams, lotions and powders	0.04%
Camellia Oleifera Seed Oil	Bath oils, tablets, and salts	0.05%
Camellia Oleifera Seed Oil	Eye lotions	2%
Camellia Oleifera Seed Oil	Tonics, dressings, and other hair grooming aids	2%
Camellia Oleifera Seed Oil	Blushers (all types)	1%
Camellia Oleifera Seed Oil	Lipstick	3%
Camellia Oleifera Seed Oil	Bath soaps and detergents	0.01-0.1%
Camellia Oleifera Seed Oil	Skin Cleansing (cold creams, cleansing lotions, liquids and pads)	0.003%
Camellia Oleifera Seed Oil	Body and hand crams, lotions, and powders	0.01-1%
Camellia Oleifera Seed Oil	Moisturizing creams, lotions and powders	0.08%
Camellia Oleifera Seed Oil	Night creams, lotions and powders	0.08%
Camellia Oleifera Seed Oil	Other suntan preparations	0.01%
Camellia Sinensis Seed Oil	Shampoos (noncoloring)	0.1%
Camellia Sinensis Seed Oil	Lipstick	0.1%
Camellia Sinensis Seed Oil	Bath soaps and detergents	0.1%
Camellia Sinensis Seed Oil	Deodorants (underarm)	0.1%
Camellia Sinensis Seed Oil	Body and hand crams, lotions, and powders	0.1%
Camellia Sinensis Seed Oil	Moisturizing creams, lotions and powders	0.1%
Camellia Sinensis Seed Oil	Night creams, lotions and powders	0.1%
Carica Papaya Seed Oil	Moisturizing creams, lotions and powders	0.1%
Carica Papaya Seed Oil	Night creams, lotions and powders	0.1%
Caryocar Brasilinese Fruit Oil	Lipstick	0.2%
Caryocar Brasilinese Fruit Oil	Skin Cleansing (cold creams, cleansing lotions, liquids and pads)	0.0005%
Chenopodium Quinoa Seed Oil	Hair rinses (coloring)	0.3%
Citrullus Lanatus (Watermelon) Seed Oil	Face and neck creams, lotions, and powders	2%

Cucurbita Pepo (Pumpkin) Seed Oil	Eye lotion	0.003%
Cucurbita Pepo (Pumpkin) Seed Oil	Moisturizing creams, lotions and powders	0.1%
Cucurbita Pepo (Pumpkin) Seed Oil	Night creams, lotions and powders	0.1%
Euterpe Oleracea Fruit Oil	Bath oils, tablets, and salts	0.05%
Euterpe Oleracea Fruit Oil	Eye lotion	0.5%
Euterpe Oleracea Fruit Oil	Lipstick	0.002%
Euterpe Oleracea Fruit Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.00001%
Euterpe Oleracea Fruit Oil	Other suntan preparations	0.001%
Irvingia Gabonensis Kernel Butter	Lipstick	0.003-0.3%
Irvingia Gabonensis Kernel Butter	Face and neck creams, lotions, and powders	0.2-0.4%
Irvingia Gabonensis Kernel Butter	Body and hand creams, lotions, and powders	0.03%
Limnanthes Alba (Meadowfoam) Seed Oil	Bath oils, tablets, and salts	0.9%
Limnanthes Alba (Meadowfoam) Seed Oil	Bubble baths	0.5%
Limnanthes Alba (Meadowfoam) Seed Oil	Eyeliner	6-20%
Limnanthes Alba (Meadowfoam) Seed Oil	Eye lotion	0.1-0.4%
Limnanthes Alba (Meadowfoam) Seed Oil	Other fragrance preparations	3%
Limnanthes Alba (Meadowfoam) Seed Oil	Hair conditioners	0.1-1%
Limnanthes Alba (Meadowfoam) Seed Oil	Tonics, dressings, and other hair grooming aids	0.5%
Limnanthes Alba (Meadowfoam) Seed Oil	Hair dyes and colors (all types requiring caution statement and patch test)	0.2-2%
Limnanthes Alba (Meadowfoam) Seed Oil	Foundations	0.01-5%
Limnanthes Alba (Meadowfoam) Seed Oil	Lipstick	0.6-26%
Limnanthes Alba (Meadowfoam) Seed Oil	Cuticle softeners	0.5%
Limnanthes Alba (Meadowfoam) Seed Oil	Bath soaps and detergents	0.01%
Limnanthes Alba (Meadowfoam) Seed Oil	Other personal cleanliness products	0.6%
Limnanthes Alba (Meadowfoam) Seed Oil	Shaving cream (aerosol, brushless, and lather)	0.05%
Limnanthes Alba (Meadowfoam) Seed Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.002%
Limnanthes Alba (Meadowfoam) Seed Oil	Depilatories	2%
Limnanthes Alba (Meadowfoam) Seed Oil	Face and neck creams, lotions, and powders	0.08-72%
Limnanthes Alba (Meadowfoam) Seed Oil	Body and hand creams, lotions, and powders	0.005-27%
Limnanthes Alba (Meadowfoam) Seed Oil	Body and hand sprays	0.1%

Limnanthes Alba (Meadowfoam) Seed Oil	Moisturizing creams, lotions and powders	0.04- 74%
Limnanthes Alba (Meadowfoam) Seed Oil	Night creams, lotions and powders	0.04-3%
Limnanthes Alba (Meadowfoam) Seed Oil	Other skin care preparations	0.1-1%
Linum Usitatissimum (Linseed) Seed Oil	Bath oils, tablets, and salts	0.02%
Linum Usitatissimum (Linseed) Seed Oil	Bubble baths	0.2%
Linum Usitatissimum (Linseed) Seed Oil	Eye lotion	0.01%
Linum Usitatissimum (Linseed) Seed Oil	Mascara	10%
Linum Usitatissimum (Linseed) Seed Oil	Hair conditioners	0.001-0.01%
Linum Usitatissimum (Linseed) Seed Oil	Shampoos (noncoloring)	0.001-0.1%
Linum Usitatissimum (Linseed) Seed Oil	Tonics, dressings, and other hair	0.01%
Linum Usitatissimum (Linseed) Seed Oil	Lipstick	0.01%
Linum Usitatissimum (Linseed) Seed Oil	Cuticle softeners	0.05%
Linum Usitatissimum (Linseed) Seed Oil	Nail polish and enamel	0.002%
Linum Usitatissimum (Linseed) Seed Oil	Bath soaps and detergents	0.003-0.4%
Linum Usitatissimum (Linseed) Seed Oil	Deodorants (underarm)	0.05-0.1%
Linum Usitatissimum (Linseed) Seed Oil	Aftershave lotions	4%
Linum Usitatissimum (Linseed) Seed Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.01-1%
Linum Usitatissimum (Linseed) Seed Oil	Face and neck creams, lotions, and powders	0.01-0.5%
Linum Usitatissimum (Linseed) Seed Oil	Body and hand creams, lotions, and powders	0.1-0.2%
Linum Usitatissimum (Linseed) Seed Oil	Moisturizing creams, lotions and powders	0.01-0.1%
Linum Usitatissimum (Linseed) Seed Oil	Night creams, lotions and powders	0.1%
Mangifera Indica (Mango) Seed Oil	Eyeliner	5%
Mangifera Indica (Mango) Seed Oil	Hair conditioners	0.2%
Mangifera Indica (Mango) Seed Oil	Hair straighteners	0.05%
Mangifera Indica (Mango) Seed Oil	Shampoos (noncoloring)	0.1%
Mangifera Indica (Mango) Seed Oil	Tonics, dressings, and other hair grooming aids	0.01%
Mangifera Indica (Mango) Seed Oil	Hair dyes and colors (all types requiring caution statement and patch test)	0.05%
Mangifera Indica (Mango) Seed Oil	Lipstick	0.03-6%
Mangifera Indica (Mango) Seed Oil	Bath soaps and detergents	0.1%
Mangifera Indica (Mango) Seed Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.003-0.5%

Mangifera Indica (Mango) Seed Oil	Face and neck creams, lotions, and powders	0.2-3%
Mangifera Indica (Mango) Seed Oil	Body and hand creams, lotions, and powders	0.1-0.9%
Mangifera Indica (Mango) Seed Oil	Moisturizing creams, lotions and powders	0.08%
Mangifera Indica (Mango) Seed Oil	Night creams, lotions and powders	0.08%
Mangifera Indica (Mango) Seed Oil	Other skin care preparations	1%
Mangifera Indica (Mango) Seed Oil	Indoor tanning preparations	0.1%
Mangifera Indica (Mango) Seed Butter	Eye shadow	0.02%
Mangifera Indica (Mango) Seed Butter	Hair sprays (aerosol fixatives)	0.02%
Mangifera Indica (Mango) Seed Butter	Shampoos (noncoloring)	0.1-0.5%
Mangifera Indica (Mango) Seed Butter	Tonics, dressings, and other hair grooming aids	0.5%
Mangifera Indica (Mango) Seed Butter	Blushers (all types)	0.02%
Mangifera Indica (Mango) Seed Butter	Face powders	0.02%
Mangifera Indica (Mango) Seed Butter	Foundations	0.02-5%
Mangifera Indica (Mango) Seed Butter	Lipstick	1-5%
Mangifera Indica (Mango) Seed Butter	Makeup bases	0.01%
Mangifera Indica (Mango) Seed Butter	Cuticle softeners	0.5%
Mangifera Indica (Mango) Seed Butter	Bath soaps and detergents	0.0005-0.1%
Mangifera Indica (Mango) Seed Butter	Other personal cleanliness products	0.5%
Mangifera Indica (Mango) Seed Butter	Shaving cream (aerosol, brushless and lather)	0.1%
Mangifera Indica (Mango) Seed Butter	Depilatories	0.05%
Mangifera Indica (Mango) Seed Butter	Face and neck creams, lotions, and powders	1-3%
Mangifera Indica (Mango) Seed Butter	Body and hand creams, lotions, and powders	0.1-3%
Mangifera Indica (Mango) Seed Butter	Moisturizing creams, lotions and powders	0.1%
Mangifera Indica (Mango) Seed Butter	Night creams, lotions and powders	0.1%
Mangifera Indica (Mango) Seed Butter	Other skin care preparations	0.04-2%
Moringa Oleifera Seed Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.01%
Moringa Pterygosperma Seed Oil	Eye lotion	3%
Moringa Pterygosperma Seed Oil	Tonics, dressings, and other hair grooming aids	0.02%
Moringa Pterygosperma Seed Oil	Other personal cleanliness products	0.003%
Moringa Pterygosperma Seed Oil	Body and hand creams, lotions, and powders	0.004%
Oenothera Biennis (Evening Primrose) Oil	Bubble baths	0.2%

Oenothera Biennis (Evening Primrose) Oil	Eye lotion	0.00002-0.5%
Oenothera Biennis (Evening Primrose) Oil	Eye makeup remover	0.002%
Oenothera Biennis (Evening Primrose) Oil	Shampoos (noncoloring)	0.05-0.1%
Oenothera Biennis (Evening Primrose) Oil	Tonics, dressings, and other hair grooming aids	0.1%
Oenothera Biennis (Evening Primrose) Oil	Blushers (all types)	0.08%
Oenothera Biennis (Evening Primrose) Oil	Foundations	58%
Oenothera Biennis (Evening Primrose) Oil	Lipstick	0.1-15%
Oenothera Biennis (Evening Primrose) Oil	Cuticle softeners	3%
Oenothera Biennis (Evening Primrose) Oil	Nail creams and lotions	0.001-0.3%
Oenothera Biennis (Evening Primrose) Oil	Nail polish and enamel	0.001%
Oenothera Biennis (Evening Primrose) Oil	Bath soaps and detergents	0.1-0.2%
Oenothera Biennis (Evening Primrose) Oil	Deodorants (underarm)	0.2%
Oenothera Biennis (Evening Primrose) Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.001-0.5%
Oenothera Biennis (Evening Primrose) Oil	Face and neck creams, lotions, and powders	0.08-2%
Oenothera Biennis (Evening Primrose) Oil	Body and hand creams, lotions, and powders	0.1-2%
Oenothera Biennis (Evening Primrose) Oil	Moisturizing creams, lotions and powders	0.04-0.1%
Oenothera Biennis (Evening Primrose) Oil	Night creams, lotions and powders	0.008-3%
Oenothera Biennis (Evening Primrose) Oil	Paste masks (mud packs)	0.1%
Oenothera Biennis (Evening Primrose) Oil	Other skin care preparations	0.002-0.1%
Oenothera Biennis (Evening Primrose) Oil	Indoor tanning preparations	0.003%
Oenothera Biennis (Evening Primrose) Oil	Other suntan preparations	0.5%
Orbignya Oleifera Seed Oil	Bath capsules	0.1%
Orbignya Oleifera Seed Oil	Other bath preparations	0.01%
Orbignya Oleifera Seed Oil	Eye shadow	0.5-0.6%
Orbignya Oleifera Seed Oil	Hair conditioners	0.3-2%
Orbignya Oleifera Seed Oil	Hair sprays (aerosol fixatives)	0.02%
Orbignya Oleifera Seed Oil	Tonics, dressings, and other hair grooming aids	0.1-1%
Orbignya Oleifera Seed Oil	Foundations	0.5%
Orbignya Oleifera Seed Oil	Lipstick	0.001-2%
Orbignya Oleifera Seed Oil	Bath soaps and detergents	27%
Orbignya Oleifera Seed Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.05%

Orbignya Oleifera Seed Oil	Body and hand creams, lotions, and powders	0.005-1%
Orbignya Oleifera Seed Oil	Foot powders and sprays	2%
Orbignya Oleifera Seed Oil	Moisturizing creams, lotions and powders	0.1%
Orbignya Oleifera Seed Oil	Night creams, lotions and powders	0.1%
Orbignya Oleifera Seed Oil	Other skin care preparations	4%
Orbignya Oleifera Seed Oil	Suntan gels, creams, and liquids	0.0009%
Sodium Babassuate	Bath soaps and detergents	8%
Prunus Armeniaca (Apricot) Kernel Oil	Baby lotions, oils, powders and creams	4%
Prunus Armeniaca (Apricot) Kernel Oil	Other bath preparations	7%
Prunus Armeniaca (Apricot) Kernel Oil	Eye shadow	0.002-2%
Prunus Armeniaca (Apricot) Kernel Oil	Eye lotion	0.2-9%
Prunus Armeniaca (Apricot) Kernel Oil	Eye makeup remover	18%
Prunus Armeniaca (Apricot) Kernel Oil	Mascara	0.002-0.05%
Prunus Armeniaca (Apricot) Kernel Oil	Powders (dusting and talcum) (excluding aftershave)	0.1%
Prunus Armeniaca (Apricot) Kernel Oil	Other fragrance preparations	0.02-1%
Prunus Armeniaca (Apricot) Kernel Oil	Hair conditioners	0.003-89%
Prunus Armeniaca (Apricot) Kernel Oil	Hair sprays (aerosol fixatives)	0.0009%
Prunus Armeniaca (Apricot) Kernel Oil	Hair straighteners	0.0001%
Prunus Armeniaca (Apricot) Kernel Oil	Rinses (noncoloring)	0.05%
Prunus Armeniaca (Apricot) Kernel Oil	Shampoos (noncoloring)	0.1-0.5%
Prunus Armeniaca (Apricot) Kernel Oil	Tonics, dressings, and other hair grooming aids	0.001-0.1%
Prunus Armeniaca (Apricot) Kernel Oil	Hair dyes and colors (all types requiring caution statement and patch test)	0.1%
Prunus Armeniaca (Apricot) Kernel Oil	Blushers (all types)	0.2%
Prunus Armeniaca (Apricot) Kernel Oil	Face powders	0.1-0.6%
Prunus Armeniaca (Apricot) Kernel Oil	Foundations	0.1-1%
Prunus Armeniaca (Apricot) Kernel Oil	Leg and body paints	0.001%
Prunus Armeniaca (Apricot) Kernel Oil	Lipstick	0.001-5%
Prunus Armeniaca (Apricot) Kernel Oil	Other makeup preparations	0.2%
Prunus Armeniaca (Apricot) Kernel Oil	Basecoats and undercoats (manicuring preparations)	0.05%
Prunus Armeniaca (Apricot) Kernel Oil	Cuticle softeners	0.05-5%
Prunus Armeniaca (Apricot) Kernel Oil	Nail creams and lotions	2-40%

Prunus Armeniaca (Apricot) Kernel Oil	Nail polish and enamel	0.05%
Prunus Armeniaca (Apricot) Kernel Oil	Nail polish and enamel removers	0.002-0.01%
Prunus Armeniaca (Apricot) Kernel Oil	Bath soaps and detergents	0.1-9%
Prunus Armeniaca (Apricot) Kernel Oil	Deodorants (underarm)	0.003-0.1%
Prunus Armeniaca (Apricot) Kernel Oil	Other personal cleanliness products	0.01-0.5%
Prunus Armeniaca (Apricot) Kernel Oil	Aftershave lotions	0.5%
Prunus Armeniaca (Apricot) Kernel Oil	Shaving cream (aerosol, brushless, and lather)	0.1%
Prunus Armeniaca (Apricot) Kernel Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.001-3%
Prunus Armeniaca (Apricot) Kernel Oil	Depilatories	0.00001-2%
Prunus Armeniaca (Apricot) Kernel Oil	Face and neck creams, lotions, and powders	0.05-17%
Prunus Armeniaca (Apricot) Kernel Oil	Body and hand creams, lotions, and powders	0.03-12%
Prunus Armeniaca (Apricot) Kernel Oil	Moisturizing creams, lotions and powders	0.1-3%
Prunus Armeniaca (Apricot) Kernel Oil	Night creams, lotions and powders	0.1-8%
Prunus Armeniaca (Apricot) Kernel Oil	Paste masks (mud packs)	2%
Prunus Armeniaca (Apricot) Kernel Oil	Skin fresheners	0.01%
Prunus Armeniaca (Apricot) Kernel Oil	Other skin care preparations	0.0001-0.5%
Prunus Armeniaca (Apricot) Kernel Oil	Suntan gels, creams, and liquids	0.01-0.05%
Prunus Armeniaca (Apricot) Kernel Oil	Indoor tanning preparations	0.01-1%
Prunus Armeniaca (Apricot) Kernel Oil	Other suntan preparations	0.0005%
Prunus Avium (Sweet) Cherry Seed Oil	Bath soaps and detergents	0.01-0.02%
Prunus Domestica Seed Oil	Preshave lotions (all types)	0.04%
Prunus Persica (Peach) Kernel Oil	Bath oils, tablets, and salts	0.1%
Prunus Persica (Peach) Kernel Oil	Other bath preparations	1%
Prunus Persica (Peach) Kernel Oil	Other fragrance preparations	2%
Prunus Persica (Peach) Kernel Oil	Hair dyes and colors (all types requiring caution statement and patch test)	0.1%
Prunus Persica (Peach) Kernel Oil	Lipstick	0.04-22%
Prunus Persica (Peach) Kernel Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.003-6%
Prunus Persica (Peach) Kernel Oil	Face and neck creams, lotions, and powders	0.2-0.4%
Prunus Persica (Peach) Kernel Oil	Body and hand creams, lotions, and powders	0.8-3%
Prunus Persica (Peach) Kernel Oil	Moisturizing creams, lotions and powders	0.08%

Prunus Persica (Peach) Kernel Oil	Night creams, lotions and powders	0.08%
Prunus Persica (Peach) Kernel Oil	Other suntan preparations	0.05%
Ribes Nigrum (Black Currant) Seed Oil	Eye lotion	0.08%
Ribes Nigrum (Black Currant) Seed Oil	Lipstick	0.03-0.1%
Ribes Nigrum (Black Currant) Seed Oil	Nail creams and lotions	0.2%
Ribes Nigrum (Black Currant) Seed Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.05%
Ribes Nigrum (Black Currant) Seed Oil	Body and hand creams, lotions, and powders	0.01%
Ribes Nigrum (Black Currant) Seed Oil	Moisturizing creams, lotions and powders	0.1-0.3%
Ribes Nigrum (Black Currant) Seed Oil	Night creams, lotions and powders	0.1%
Ribes Nigrum (Black Currant) Seed Oil	Other skin care preparations	0.000001%
Rubus Idaeus (Raspberry) Seed Oil	Face and neck creams, lotions, and powders	5%
Rubus Idaeus (Raspberry) Seed Oil	Night creams, lotions and powders	0.1%
Sclerocarya Birrea Seed Oil	Hair conditioners	1%
Sclerocarya Birrea Seed Oil	Shampoos (noncoloring)	1%
Sclerocarya Birrea Seed Oil	Body and hand creams, lotions and powders	1%
Sclerocarya Birrea Seed Oil	Other skin care preparations	1%
Silybum Marianum Seed Oil	Foundations	0.5%
Solanum Lycopersicum (Tomato) Fruit Oil	Eye shadow	0.01%
Solanum Lycopersicum (Tomato) Fruit Oil	Blushers (all types)	0.01%
Solanum Lycopersicum (Tomato) Fruit Oil	Face powders	0.05%
Solanum Lycopersicum (Tomato) Fruit Oil	Lipstick	0.001%
Solanum Lycopersicum (Tomato) Fruit Oil	Other skin care preparations	1%
Theobroma Cacao (Cocoa) Seed Butter	Baby lotions, oils, powders and creams	0.01%
Theobroma Cacao (Cocoa) Seed Butter	Other baby products	0.01%
Theobroma Cacao (Cocoa) Seed Butter	Bath oils, tablets and salts	0.1%
Theobroma Cacao (Cocoa) Seed Butter	Other bath preparations	1%
Theobroma Cacao (Cocoa) Seed Butter	Eyebrow pencil	0.02%
Theobroma Cacao (Cocoa) Seed Butter	Eyeliner	0.02-9%

Theobroma Cacao (Cocoa) Seed Butter	Eye lotion	0.9-4%
Theobroma Cacao (Cocoa) Seed Butter	Mascara	0.0002%
Theobroma Cacao (Cocoa) Seed Butter	Hair conditioners	1%
Theobroma Cacao (Cocoa) Seed Butter	Hair straighteners	0.01%
Theobroma Cacao (Cocoa) Seed Butter	Shampoos (noncoloring)	0.01-0.1%
Theobroma Cacao (Cocoa) Seed Butter	Tonics, dressings and other hair grooming aids	0.1-2%
Theobroma Cacao (Cocoa) Seed Butter	Hair dyes and colors (all types requiring caution statement and patch test)	0.1%
Theobroma Cacao (Cocoa) Seed Butter	Blushers (all types)	0.4%
Theobroma Cacao (Cocoa) Seed Butter	Foundations	0.2-2%
Theobroma Cacao (Cocoa) Seed Butter	Lipstick	0.3-37%
Theobroma Cacao (Cocoa) Seed Butter	Makeup bases	0.02%
Theobroma Cacao (Cocoa) Seed Butter	Makeup fixatives	0.00004%
Theobroma Cacao (Cocoa) Seed Butter	Other makeup preparations	9%
Theobroma Cacao (Cocoa) Seed Butter	Cuticle softeners	0.1%
Theobroma Cacao (Cocoa) Seed Butter	Nail creams and lotions	1%
Theobroma Cacao (Cocoa) Seed Butter	Bath soaps and detergents	0.02-2%
Theobroma Cacao (Cocoa) Seed Butter	Deodorants (underarm)	0.001-1%
Theobroma Cacao (Cocoa) Seed Butter	Other personal cleanliness products	0.1%
Theobroma Cacao (Cocoa) Seed Butter	Aftershave lotions	1%
Theobroma Cacao (Cocoa) Seed Butter	Shaving (aerosol, brushless and lather)	0.01-0.1%
Theobroma Cacao (Cocoa) Seed Butter	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.0001-1%
Theobroma Cacao (Cocoa) Seed Butter	Depilatories	0.05-1%
Theobroma Cacao (Cocoa) Seed Butter	Face and neck creams, lotions and powders	0.08-3%
Theobroma Cacao (Cocoa) Seed Butter	Body and hand creams, lotions and powders	0.000002-6%
Theobroma Cacao (Cocoa) Seed Butter	Foot powders and sprays	0.4%
Theobroma Cacao (Cocoa) Seed Butter	Moisturizing creams, lotions and powders	2%
Theobroma Cacao (Cocoa) Seed Butter	Night creams, lotions and powders	2%
Theobroma Cacao (Cocoa) Seed Butter	Other skin care preparations	0.1-25%
Theobroma Cacao (Cocoa) Seed Butter	Suntan gels, creams and liquids	5%
Theobroma Cacao (Cocoa) Seed Butter	Indoor tanning preparations	0.1-0.5%
Theobroma Cacao (Cocoa) Seed Butter	Other suntan preparations	0.5%

Theobroma Grandiflorum Seed Butter	Eyeliner	2%
Theobroma Grandiflorum Seed Butter	Eye shadow	0.1%
Theobroma Grandiflorum Seed Butter	Eye lotion	2%
Theobroma Grandiflorum Seed Butter	Hair conditioners	0.001-1%
Theobroma Grandiflorum Seed Butter	Shampoos (noncoloring)	0.001-0.1%
Theobroma Grandiflorum Seed Butter	Tonics, dressings and other hair grooming aids	0.01%
Theobroma Grandiflorum Seed Butter	Other hair preparations (noncoloring)	1%
Theobroma Grandiflorum Seed Butter	Foundations	5%
Theobroma Grandiflorum Seed Butter	Lipstick	7%
Theobroma Grandiflorum Seed Butter	Bath soaps and detergents	0.1%
Theobroma Grandiflorum Seed Butter	Deodorants (underarm)	0.1%
Theobroma Grandiflorum Seed Butter	Other personal cleanliness products	0.05%
Theobroma Grandiflorum Seed Butter	Aftershave lotions	0.1%
Theobroma Grandiflorum Seed Butter	Shaving cream (aerosol, brushless and lather)	0.1%
Theobroma Grandiflorum Seed Butter	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.003%
Theobroma Grandiflorum Seed Butter	Face and neck creams, lotions and powders	2-5%
Theobroma Grandiflorum Seed Butter	Body and hand creams, lotions and powders	0.1-5%
Theobroma Grandiflorum Seed Butter	Moisturizing creams, lotions and powders	0.1%
Theobroma Grandiflorum Seed Butter	Night creams, lotions and powders	0.1-3%
Theobroma Grandiflorum Seed Butter	Other skin care preparations	0.00005%
Vaccinium Macrocarpon (Cranberry) Seed Oil	Hair conditioners	0.1%
Vaccinium Macrocarpon (Cranberry) Seed Oil	Shampoos (noncoloring)	0.01%
Vaccinium Macrocarpon (Cranberry) Seed Oil	Tonics, dressings and other hair grooming aids	0.1%
Vaccinium Macrocarpon (Cranberry) Seed Oil	Foundations	0.1%
Vaccinium Macrocarpon (Cranberry) Seed Oil	Lipstick	0.3%
Vaccinium Macrocarpon (Cranberry) Seed Oil	Other makeup preparations	0.002%
Vaccinium Macrocarpon (Cranberry) Seed Oil	Bath soaps and detergents	0.003-0.1%

Vaccinium Macrocarpon (Cranberry) Seed Oil	Face and neck creams, lotions and powders	2%
Vaccinium Macrocarpon (Cranberry) Seed Oil	Body and hand creams, lotions and powders	0.1%
Vaccinium Macrocarpon (Cranberry) Seed Oil	Moisturizing creams, lotions and powders	0.1%
Vaccinium Macrocarpon (Cranberry) Seed Oil	Night creams, lotions and powders	0.1%
Vitis Vinifera (Grape) Seed Oil	Bath oils, tablets and salts	0.1-0.5%
Vitis Vinifera (Grape) Seed Oil	Bubble baths	2%
Vitis Vinifera (Grape) Seed Oil	Other bath preparations	0.01%
Vitis Vinifera (Grape) Seed Oil	Eye lotion	5%
Vitis Vinifera (Grape) Seed Oil	Eye makeup remover	0.01%
Vitis Vinifera (Grape) Seed Oil	Perfumes	1%
Vitis Vinifera (Grape) Seed Oil	Other fragrance preparations	0.001-7%
Vitis Vinifera (Grape) Seed Oil	Hair conditioners	0.01-0.3%
Vitis Vinifera (Grape) Seed Oil	Shampoos (noncoloring)	0.05-0.1%
Vitis Vinifera (Grape) Seed Oil	Tonics, dressings and other hair grooming aids	0.01-0.1%
Vitis Vinifera (Grape) Seed Oil	Hair dyes and colors (all types requiring caution statement and patch test)	43%
Vitis Vinifera (Grape) Seed Oil	Foundations	0.2%
Vitis Vinifera (Grape) Seed Oil	Lipstick	0.03-7%
Vitis Vinifera (Grape) Seed Oil	Cuticle softeners	35%
Vitis Vinifera (Grape) Seed Oil	Nail creams and lotions	1%
Vitis Vinifera (Grape) Seed Oil	Nail polish and enamel	0.001%
Vitis Vinifera (Grape) Seed Oil	Bath soaps and detergents	0.01-7%
Vitis Vinifera (Grape) Seed Oil	Deodorants (underarm)	0.001-0.2%
Vitis Vinifera (Grape) Seed Oil	Other personal cleanliness products	0.001-1%
Vitis Vinifera (Grape) Seed Oil	Aftershave lotions	0.1-1%
Vitis Vinifera (Grape) Seed Oil	Preshave lotions (all types)	16-39%
Vitis Vinifera (Grape) Seed Oil	Shaving cream (aerosol, brushless and lather)	2%
Vitis Vinifera (Grape) Seed Oil	Other shaving preparations	0.1%
Vitis Vinifera (Grape) Seed Oil	Skin cleansing (cold creams, cleansing lotions, liquids and pads)	0.004-20%

Vitis Vinifera (Grape) Seed Oil	Depilatories	0.5%
Vitis Vinifera (Grape) Seed Oil	Face and neck creams, lotions and powders	0.1-8%
Vitis Vinifera (Grape) Seed Oil	Body and hand creams, lotions and powders	0.01-41%
Vitis Vinifera (Grape) Seed Oil	Body and hand sprays	1%
Vitis Vinifera (Grape) Seed Oil	Moisturizing creams, lotions and powders	0.01-5%
Vitis Vinifera (Grape) Seed Oil	Night creams, lotions and powders	0.01-5%
Vitis Vinifera (Grape) Seed Oil	Paste masks (mud packs)	0.01%
Vitis Vinifera (Grape) Seed Oil	Other skin care preparations	0.01-13%
Vitis Vinifera (Grape) Seed Oil	Indoor tanning preparations	0.001%
Vitis Vinifera (Grape) Seed Oil	Other suntan preparations	15%
Hydrogenated Grapeseed Oil	Other bath preparations	0.5%
Hydrogenated Grapeseed Oil	Lipstick	0.5%
Hydrogenated Grapeseed Oil	Cuticle softeners	0.3%

*Ingredients included in the title of the table, but not found in the table were included in the survey, but no uses were reported

Information collected in 2010

Table prepared May 13, 2010

Table updated January 20, 2011 (removed Citrus Grandis uses - company using an essential oil from the peel)

The following ingredients will be included in a later concentration of use survey: Camellia Japonica Seed Oil, Citrus Aurantifolia (Lime) Seed Oil Unsaponifiables, Persea Gratissima (Avocado) Oil, Hydrogenated Avocado Oil, Persea Gratissima (Avocado) Butter, Persea Gratissima (Avocado) Oil Unsaponifiables, Sodium Avocadoate, Triticum Vulgare (Wheat) Germ Oil, Hydrogenated Wheat Germ Oil, Hydrogenated Wheat Germ Oil Unsaponifiables, Triticum Aestivum (Wheat) Germ Oil, Triticum Vulgare (Wheat) Germ Oil Unsaponifiables and Wheat Germ Acid.