RE-REVIEW

Alkyl Esters

CIR EXPERT PANEL MEETING

MARCH 5-6, 2012

Cosmetic Ingredient Review
Commitment . . . Credibility
Since 1976

C I R

Memorandum

To: CIR Expert Panel Members and Liaisons
From: Monice M. Fiume MMF
Senior Scientific Analyst/Writer
Date: February 10, 2012
Subject: Re-Review of Alkyl Esters as Used in Cosmetics

Cetyl esters, a synthetic wax composed of a mixture of esters of saturated fatty acids and fatty alcohols with carbon chain lengths between 14 and 18, was reviewed previously by the Expert Panel in 1997. It is now being presented for consideration for re-review. (This ingredient was found safe as used in 1997).

Cetyl esters is a member of a broader group of cosmetic ingredients called the alkyl esters, and 200 alkyl esters are being presented as possible "add-on ingredients" to this re-review. These ingredients, which are listed alphabetically in Table 1a of the report, consist of the reaction products of fatty acids and alcohols. For many of these add-ons, one or all constituents of these esters have been reviewed by CIR, as indicated in Table 1b. The conclusions reached by the CIR regarding the safety of these constituents are provided in Table 3a.

Additionally, CIR has already reviewed the 56 alkyl esters listed in Table 2. These ingredients are not included as add-ons because they have either been recently reviewed or recently considered for re-review. The conclusions reached by the Panel for these 56 ingredients are provided in Table 3b. An exception is isopropyl isostearate, an alkyl ester that has been reviewed previously by the CIR, is included on the list of potential add-ons because it is past due for re-review. In 1992, the Panel concluded that the data were insufficient to support the safety of isopropyl linoleate as used in cosmetics.

In the original safety assessment on cetyl esters, there was little data available on the ingredient itself and the Panel relied on safety data on the individual constituents in reaching a conclusion. The CIR has often been able to extrapolate data in making conclusions of safety, so using "read-across" data in this report will be nothing new. However, because there are a large number of previous CIR reports that will support the safety of the alkyl esters included in this re-review, only data on the actual alkyl esters being considered for review will be included in this text of this safety assessment. The Panel is being provided three supplemental books that include 1.) the original Cetyl Esters report and the reports on previously reviewed alkyl esters; 2.) CIR reports on relevant acids; and 3.) CIR reports on relevant alcohols. (Each book has an index of page numbers, and the PDF files are bookmarked.)

The data profile includes the 56 previously-reviewed alkyl esters and all the relevant acids and alcohols that have been reviewed. To facilitate the "read-across" of this data, multiple versions of this profile have been prepared that group the ingredients differently, i.e., alphabetically (and therefore by alcohol moiety); by chain length and chemical structure; and by the acid moiety.

The following unpublished reports were received from RIFM and are included in the data tab:

1. MB Research Laboratories Inc. 1975. Acute oral toxicity in rats and dermal toxicity in rabbits.
2. Kligman AM. 1975. Report on human maximization studies.

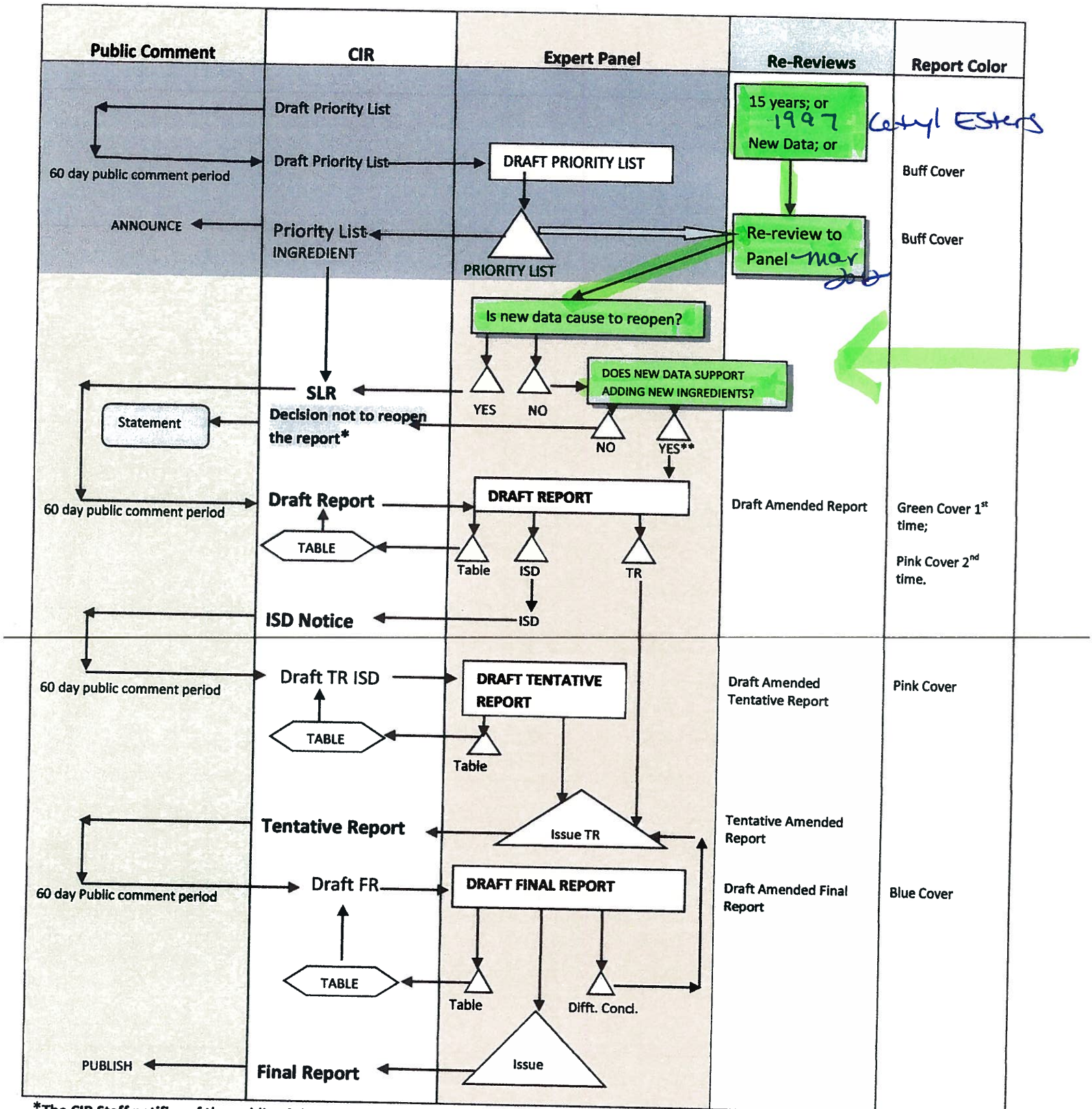
At this meeting, the Panel is being asked to confirm the conclusion in the original report and also to re-open the report to add the group of ingredients for which the safety can be supported by the available data. At the next meeting, a draft tentative amended safety assessment will be reviewed.

Alkyl Esters

Distributed for comment - do not cite or quote

SAFETY ASSESSMENT FLOW CHART

March 2012



*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 Draft 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

⇨ Option for Re-review

Alkyl Esters Re-Review

March 5-6, 2012: original consideration of re-review

The re-review of Cetyl Esters was presented for consideration to re-open. An additional 200 alkyl esters were presented as potential add-on ingredients.

Alkyl Esters Data Profile –**presented alphabetically (and therefore by alcohol moiety)** – March 2012 – Writer, Monice Fiume																					
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Cetyl Esters	1997	X					X								X						X
Proposed Add-Ons																					
Arachidyl Behenate																					
Arachidyl Erucate																					
Batyl Isostearate																					
Batyl Stearate																					
Behenyl Beeswax																					
Behenyl Behenate																					
Behenyl Erucate																					
Behenyl Isostearate																					
Behenyl/Isostearyl Beeswax																					
Behenyl Olivate																					
Butyl Avocadate																					
Butyl Babassuate																					
Butyl Isostearate																					
Butyl Oleate			X			X	X												X		
Butyloctyl Beeswax																					
Butyloctyl Behenate																					
Butyloctyl Candelillate																					
Butyloctyl Cetearate																					
Butyloctyl Oleate																					
Butyloctyl Palmitate																					
C14-30 Alkyl Beeswax																					
C18-38 Alkyl Beeswax																					
C30-50 Alkyl Beeswax																					
C20-40 Alkyl Behenate																					
C18-38 Alkyl C24-54 Acid Ester																					
C12-13 Alkyl Ethylhexanoate																					
C12-15 Alkyl Ethylhexanoate																					
C14-18 Alkyl Ethylhexanoate																					
C16-36 Alkyl Stearate																					
C20-40 Alkyl Stearate																					
C30-50 Alkyl Stearate																					
C40-60 Alkyl Stearate																					
Caprylyl Butyrate																					
Caprylyl Eicosenoate																					
Cetearyl Behenate																					
Cetearyl Candelillate																					
Cetearyl Olivate																					
Cetearyl Palmate																					
Cetearyl Palmitate																					
Cetearyl Rice Branate																					
Cetearyl Stearate																					
Cetyl Babassuate																					
Cetyl Behenate			X																		
Cetyl Caprate																					
Cetyl Caprylate																					
Cetyl Dimethyloctanoate																					
Cetyl Ethylhexanoate															X			X			
Cetyl Laurate																					
Cetyl Oleate			X	X																	
Cetyl Tallowate																					
Chimyl Isostearate																					
Chimyl Stearate																					
C10-40 Isoalkyl Acid Octyldodecanol Esters																					
C4-5 Isoalkyl Cocoate																					
C32-36 Isoalkyl Stearate																					
Coco-Caprylate																					
Coco-Caprylate/Caprate																					
Coco-Rapeseedate																					
Decyl Castorate																					
Decyl Hempseedate																					

Alkyl Esters Data Profile –**presented alphabetically (and therefore by alcohol moiety)** – March 2012 – Writer, Monice Fiume																						
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Decyl Isostearate																						
Decyl Jojobate																						
Decyl Laurate																						
Decyl Olivate																						
Decyl Palmitate																						
Decyltetradecyl Cetearate																						
Decyltetradecyl Ethylhexanoate																						
Ethylhexyl Adipate/Palmitate/Stearate																						
Ethylhexyl C10-40 Isoalkyl Acidate																						
Ethylhexyl Ethylhexanoate			X																			
Ethylhexyl Hydroxystearate																						
Ethylhexyl Isopalmitate																						
Ethylhexyl Isostearate																						
Ethylhexyl Laurate			X			X	X	X		X			X		X	X		X			X	
Ethylhexyl Neopentanoate																						
Ethylhexyl Oleate			X																			
Ethylhexyl Olivate																						
Erucyl Arachidate																						
Erucyl Erucate																						
Erucyl Oleate																						
Heptyl Undecylenate																						
Heptylundecyl Hydroxystearate																						
Hexyldecyl Ester of Hydrolyzed Collagen																						
Hexyldecyl Ethylhexanoate																						
Hexyldecyl Hexyldecanoate																						
Hexyldecyl Isostearate																						
Hexyldecyl Laurate																						
Hexyldecyl Oleate																						
Hexyldecyl Palmitate																						
Hexyldecyl Stearate																						
Hexyldodecyl/Octyldecyl Hydroxystearate																						
Hexyl Isostearate																						
Hexyl Laurate																						
Hydrogenated Castor Oil Behenyl Esters																						
Hydrogenated Castor Oil Cetyl Esters																						
Hydrogenated Castor Oil Stearyl Esters																						
Hydrogenated Ethylhexyl Olivate																						
Hydrogenated Ethylhexyl Sesamate																						
Hydrogenated Isocetyl Olivate																						
Hydrogenated Isopropyl Jojobate																						
Hydroxycetyl Isostearate																						
Hydroxyoctacosanyl Hydroxystearate																						
Isoamyl Laurate																						
Isobutyl Palmitate																						
Isobutyl Tallowate																						
Isocetyl Behenate																						
Isocetyl Ethylhexanoate																						
Isocetyl Isodecanoate																						
Isocetyl Isostearate																						
Isocetyl Laurate																						
Isocetyl Palmitate																						
Isodecyl Ethylhexanoate																						
Isodecyl Hydroxystearate																						
Isodecyl Laurate							X			X			X		X	X					X	
Isodecyl Neopentanoate																						
Isodecyl Palmitate																						
Isodecyl Stearate																						
Isohexyl Caprate																						
Isohexyl Laurate																						
Isohexyl Neopentanoate																						

Alkyl Esters Data Profile –**presented alphabetically (and therefore by alcohol moiety)** – March 2012 – Writer, Monice Fiume

	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Isohexyl Palmitate																					
Isolauryl Behenate																					
Isooctyl Caprylate/Caprate																					
Isooctyl Tallate																					
Isopropyl Arachidate			X																		
Isopropyl Avocadate																					
Isopropyl Babassuate																					
Isopropyl Behenate																					
Isopropyl Hydroxystearate																					
Isopropyl Jojobate																					
Isopropyl Laurate			X																		
Isopropyl Linoleate	1992	X					X								X						X
Isopropyl Oleate			X																		
Isopropyl Sorbate																					
Isopropyl Tallowate																					
Isostearyl Avocadate																					
Isostearyl Behenate																					
Isostearyl Erucate																					
Isostearyl Ethylhexanoate																					
Isostearyl Hydroxystearate																					
Isostearyl Isostearate					X																
Isostearyl Laurate																					
Isostearyl Linoleate																					
Isostearyl Palmitate																					
Isotridecyl Laurate																					
Isotridecyl Stearate																					
Lauryl Behenate			X																		
Lauryl Carpotroche Brasiliensis Seedate																					
Lauryl Ethylhexanoate																					
Lauryl Isostearate																					
Lauryl Laurate																					
Lauryl Oleate			X																		
Lauryl Palmitate			X																		
Lauryl Stearate																					
Lauryl Theobroma Grandiflorum Seedate																					
Lignoceryl Erucate																					
Myristyl Carpotroche Brasiliensis Seedate																					
Myristyl Ethylhexanoate																					
Myristyl Isostearate																					
Myristyl Laurate			X																		
Myristyl Neopentanoate																					
Myristyl Theobroma Grandiflorum Seedate																					
Octyldecyl Oleate																					
Octyldodecyl Avocadoate																					
Octyldodecyl Beeswax																					
Octyldodecyl Behenate																					
Octyldodecyl Erucate																					
Octyldodecyl Ethylhexanoate																					
Octyldodecyl Hydroxystearate																					
Octyldodecyl Isostearate																					
Octyldodecyl Meadowfoamate																					
Octyldodecyl Neodecanoate																					
Octyldodecyl Neopentanoate																					
Octyldodecyl Octyldodecanoate																					
Octyldodecyl Oleate																					
Octyldodecyl Olivate																					
Octyldodecyl Safflowerate																					
Octyldodecyl Stearate																					
Oleyl Arachidate			X																		
Oleyl Erucate																					

Alkyl Esters Data Profile –**presented alphabetically (and therefore by alcohol moiety)** – March 2012 – Writer, Monice Fiume																					
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Oleyl Linoleate																					
Oleyl Oleate			X																		
Oleyl Stearate			X																		
Propylheptyl Caprylate						X	X			X			X		X	X		X			X
Stearyl Beeswax																					
Stearyl Erucate																					
Stearyl Ethylhexanoate																					
Stearyl Linoleate																					
Tetradecyleicosyl Stearate																					
Tetradecyloctadecyl Behenate																					
Tetradecyloctadecyl Hexyldecanoate																					
Tetradecyloctadecyl Stearate																					
Tetradecylpropionates																					
Tridecyl Behenate																					
Tridecyl Erucate																					
Tridecyl Ethylhexanoate																					
Tridecyl Laurate																					
Tridecyl Neopentanoate																					
Tridecyl Stearate																					
Previously Reviewed Alkyl Esters																					
Arachidyl Propionate	1990*		X			X	X			X					X	X		X	X	X	X
Butyl Myristate	2010		X	X		X	X		X						X	X					X
Butyl Stearate	1985*	X					X			X		X			X	X		X	X	X	X
Cetearyl Ethylhexanoate	1982*	X				X	X	X	X						X	X	X	X	X	X	X
Cetearyl Isononanoate	2010		X									X							X		
Cetearyl Nonanoate	2010					X	X						X		X	X		X	X		X
Cetyl Isononanoate	2010						X						X		X	X		X			X
Cetyl Myristate	2010																				
Cetyl Palmitate	1982*	X				X	X		X	X					X	X		X	X	X	X
Cetyl Ricinoleate	2007						X								X						
Cetyl Stearate	1985*																	X	X		
Decyl Cocoate	2011																				
Decyl Myristate	2010																				
Decyl Oleate	1982*		X				X								X	X		X	X		X
Ethylhexyl Cocoate	2011																				
Ethylhexyl Isononanoate	2010												X						X		
Ethylhexyl Myristate	2010																				
Ethylhexyl Palmitate	1982*					X	X		X						X	X		X			X
Ethylhexyl Pelargonate	2010						X								X						X
Ethylhexyl Stearate	1985*						X								X			X	X	X	X
Isobutyl Myristate	2010																				
Isobutyl Perlargonate	2010																				
Isobutyl Stearate	1985*			X								X			X			X	X	X	
Isocetyl Myristate	2010		X																		
Isocetyl Stearate	1985*						X								X	X		X	X	X	X
Isodecyl Cocoate	2011																				
Isodecyl Isononanoate	2010																	X	X		
Isodecyl Myristate	2010																				
Isodecyl Oleate	1982*		X				X								X	X		X			X
Isononyl Isononanoate	2010		X						X	X			X		X			X	X		X
Isopropyl Isostearate	1992*	X													X						X
Isopropyl Myristate	2010	X	X	X		X			X				X	X	X	X		X	X	X	X
Isopropyl Palmitate	1982*	X				X	X	X	X						X			X	X	X	X
Isopropyl Ricinoleate	2007																				
Isopropyl Stearate	1985*						X											X	X		X
Isostearyl Isononanoate	2010																				
Isostearyl Myristate	2010																				
Isostearyl Neopentanoate	1985*		X				X			X					X	X	X	X	X	X	X
Isotridecyl Isononanoate	2010																				
Isotridecyl Myristate	2010																		X		
Lauryl Cocoate	2011																				
Lauryl Myristate	2010																				
Myristyl Myristate	2010	X				X	X								X	X					X
Myristyl Stearate	1985*						X								X			X			X

Alkyl Esters Data Profile –**presented alphabetically (and therefore by alcohol moiety)** – March 2012 – Writer, Monice Fiume																						
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Octyldodecyl Cocoate	2011																					
Octyldodecyl Myristate	2010		X																			
Octyldodecyl Ricinoleate	2007																					
Oleyl Myristate	2010																					
Stearyl Behenate	2010																					
Stearyl Caprylate	2010																					
Stearyl Heptanoate	2010						X						X		X	X		X	X		X
Stearyl Olivate	2010																					
Stearyl Palmitate	2010																					
Stearyl Stearate	2010																					
Tetradecyloctadecyl Myristate	2010																					
Tridecyl Cocoate																						
Tridecyl Isononanoate	2010																					
Tridecyl Myristate	2010																					
Alcohols																						
Batyl Alcohol	2011		X	X									X									
Behenyl Alcohol	1988*		X				X															X
Butyl Alcohol	2008		X	X		X	X	X		X	X	X	X					X	X			X
Cetearyl Alcohol	1988*	X	X												X			X	X			X
Cetyl Alcohol	1988*	X	X	X		X	X	X	X				X		X			X	X	X		X
Cetyl Glycol	2011																					
Chimyl Alcohol	2011	X	X	X	X		X						X		X							X
Coconut Alcohol	2011		X																			
Isopropyl Alcohol	2010			X							X	X	X	X					X			X
Isostearyl Alcohol	1988		X				X								X	X		X	X			X
Jojoba Alcohol	2008		X				X		X				X		X	X		X		X		X
Myristyl Alcohol	1988		X			X	X	X							X			X	X	X		X
Octyl Dodecanol	1985		X			X	X								X			X	X	X		X
Oleyl Alcohol	1985	X	X	X			X								X			X	X	X		X
Stearyl Alcohol	1985	X	X	X			X		X				X		X	X		X	X			X
Not Reviewed, but data were included in the Appendix to the Dicarboxylic Acid Rpt																						
Caprylic Acid															X			X				
Decyl Alcohol																		X				
Ethylhexyl Alcohol												X	X		X							X
Hexyl Alcohol																X						X
Isobutyl Alcohol											X											
Isodecyl Alcohol												X										
Isooctyl Alcohol										X		X	X	X								
Propyl Alcohol												X						X				
Acids																						
Adipic Acid	2010			X						X	X	X	X	X	X	X						X
Babassu Acid	2011																					
Coconut Acid	2011		X												X							X
Hydroxystearic Acid	1998	X	X	X						X		X	X	X				X				
Hydrolyzed Collagen	1985*		X				X		X						X	X	X	X	X	X		X
Isostearic Acid	1983*	X	X				X								X			X	X	X		X
Lauric Acid	1987*	X	X			X							X	X	X				X			X
Myristic Acid	2010	X	X			X									X			X				X
Oleic Acid	1987*	X	X	X	X	X				X			X	X	X	X		X	X	X		X
Palm Acid	2011																					
Palmitic Acid	1987*	X	X		X	X				X				X	X			X	X	X		X
Rice Bran Acid	2011																					
Safflower Acid	2011																					
Sorbic Acid	1988*		X	X			X		X	X			X	X	X	X		X	X			X
Stearic Acid	1987	X	X	X	X	X				X			X	X	X			X	X	X		X
Tall Oil Acid	2009	X					X			X		X	X					X	X	X		

*indicates that the conclusion was reaffirmed at a later time

Alkyl Esters Data Profile – **by chain length/structure** – March 2012 – Writer, Monice Fiume																					
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Cetyl Esters	1997	X					X								X						X
Proposed Add-Ons																					
Straight Chain Alkyl Ingredients – by length																					
Caprylyl Butyrate																					
Caprylyl Caprylate																					
Hexyl Laurate																					
Decyl Laurate																					
Lauryl Laurate																					
Cetyl Caprylate																					
Tridecyl Laurate																					
Cetyl Caprate																					
Decyl Palmitate																					
Myristyl Laurate			X																		
Cetyl Laurate																					
Lauryl Palmitate			X																		
Lauryl Stearate																					
Tridecyl Stearate																					
Lauryl Behenate			X																		
Tridecyl Behenate																					
Cetyl Behenate			X																		
Arachidyl Behenate																					
Behenyl Behenate																					
Unsaturated Straight Chain Ingredients – by length																					
Heptyl Undecylenate																					
Butyl Oleate			X			X	X												X		
Caprylyl Eicosenoate																					
Lauryl Oleate			X																		
Cetyl Oleate			X	X																	
Tridecyl Erucate																					
Oleyl Stearate			X																		
Stearyl Linoleate																					
Oleyl Oleate			X																		
Oleyl Linoleate																					
Oleyl Arachidate			X																		
Stearyl Erucate																					
Erucyl Oleate																					
Oleyl Erucate																					
Arachidyl Erucate																					
Behenyl Erucate																					
Erucyl Arachidate																					
Erucyl Erucate																					
Lignoceryl Erucate																					
Branched Chains – by length																					
Isohexyl Neopentanoate																					
Isopropyl Sorbate																					
Ethylhexyl Neopentanoate																					
Isodecyl Neopentanoate																					
Ethylhexyl Ethylhexanoate			X																		
Isohexyl Caprate																					
Isopropyl Laurate			X																		
Tridecyl Neopentanoate																					
Octyldodecyl Neopentanoate																					
Isodecyl Ethylhexanoate																					
Propylheptyl Caprylate						X	X			X			X		X	X		X			X
Myristyl Neopentanoate																					
Isohexyl Laurate																					
Isoamyl Laurate																					
Hexyldecyl Ethylhexanoate																					
Lauryl Ethylhexanoate																					
Ethylhexyl Laurate			X			X	X	X		X			X		X	X		X			X
Tridecyl Ethylhexanoate																					
Octyldodecyl Ethylhexanoate																					
Octyldodecyl Neodecanoate																					
Isobutyl Palmitate																					

Alkyl Esters Data Profile – **by chain length/structure** – March 2012 – Writer, Monice Fiume																						
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Isopropyl Linoleate	1992	X					X								X						X
Isopropyl Oleate			X																		
Myristyl Ethylhexanoate																					
Hexyldecyl Hexyldecanoate																					
Decyltetradecyl Ethylhexanoate																					
Isodecyl Laurate							X			X			X		X	X					X
Isohexyl Palmitate																					
Butyl Isostearate																					
Ethylhexyl Isopalmitate																					
Isocetyl Ethylhexanoate																					
Cetyl Ethylhexanoate															X			X			
Isopropyl Arachidate			X																		
Hexyldecyl Laurate																					
Isostearyl Ethylhexanoate																					
Hexyl Isostearate																					
Ethylhexyl Isostearate																					
Isotridecyl Laurate																					
Stearyl Ethylhexanoate																					
Octyldodecyl Octyldodecanoate																					
Butyloctyl Palmitate																					
Ethylhexyl Oleate			X																		
Cetyl Dimethyloctanoate																					
Isopropyl Behenate																					
Isocetyl Isodecanoate																					
Isodecyl Palmitate																					
Butyloctyl Oleate																					
Hexyldecyl Palmitate																					
Isodecyl Stearate																					
Hexyldecyl Isostearate																					
Decyl Isostearate																					
Isocetyl Laurate																					
Tetradecyloctadecyl Hexyldecanoate																					
Hexyldecyl Oleate																					
Hexyldecyl Stearate																					
Octyldecyl Oleate																					
Octyldodecyl Isostearate																					
Isostearyl Laurate																					
Lauryl Isostearate																					
Isotridecyl Stearate																					
Butyloctyl Behenate																					
Octyldodecyl Stearate																					
Octyldodecyl Oleate																					
Isocetyl Palmitate																					
Isocetyl Isostearate																					
Myristyl Isostearate																					
Isostearyl Palmitate																					
Isolauryl Behenate																					
Octyldodecyl Behenate																					
Isostearyl Isostearate					X																
Octyldodecyl Erucate																					
Isostearyl Linoleate																					
Tetradecyleicosyl Stearate																					
Tetradecyloctadecyl Stearate																					
Isocetyl Behenate																					
Behenyl Isostearate																					
Isostearyl Behenate																					
Isostearyl Erucate																					
Tetradecyloctadecyl Behenate																					
Hydroxy-Substituted																					
Isopropyl Hydroxystearate																					
Ethylhexyl Hydroxystearate																					
Isodecyl Hydroxystearate																					
Heptylundecyl Hydroxystearate																					
Octyldodecyl Hydroxystearate																					

Alkyl Esters Data Profile – **by chain length/structure** – March 2012 – Writer, Monice Fiume																					
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Hydroxycetyl Isostearate																					
Isostearyl Hydroxystearate																					
Chimyl Isostearate																					
Chimyl Stearate																					
Batyl Isostearate																					
Batyl Stearate																					
Hydroxyoctacosanyl Hydroxystearate																					
Mixtures (ordered alphabetically)																					
Behenyl Beeswax																					
Behenyl/Isostearyl Beeswax																					
Behenyl Olivate																					
Butyl Avocadate																					
Butyl Babassuate																					
Butyloctyl Beeswax																					
Butyloctyl Candelillate																					
Butyloctyl Cetearate																					
C14-30 Alkyl Beeswax																					
C18-38 Alkyl Beeswax																					
C30-50 Alkyl Beeswax																					
C20-40 Alkyl Behenate																					
C18-38 Alkyl C24-54 Acid Ester																					
C12-13 Alkyl Ethylhexanoate																					
C12-15 Alkyl Ethylhexanoate																					
C14-18 Alkyl Ethylhexanoate																					
C16-36 Alkyl Stearate																					
C20-40 Alkyl Stearate																					
C30-50 Alkyl Stearate																					
C40-60 Alkyl Stearate																					
Cetearyl Behenate																					
Cetearyl Candelillate																					
Cetearyl Olivate																					
Cetearyl Palmate																					
Cetearyl Palmitate																					
Cetearyl Rice Branate																					
Cetearyl Stearate																					
Cetyl Babassuate																					
Cetyl Tallowate																					
C10-40 Isoalkyl Acid Octyldodecanol Esters																					
C4-5 Isoalkyl Cocoate																					
C32-36 Isoalkyl Stearate																					
Coco-Caprylate																					
Coco-Caprylate/Caprate																					
Coco-Rapeseedate																					
Decyl Castorate																					
Decyl Hempseedate																					
Decyl Jojobate																					
Decyl Olivate																					
Decyltetradecyl Cetearate																					
Ethylhexyl Adipate/Palmitate/Stearate																					
Ethylhexyl C10-40 Isoalkyl Acidate																					
Ethylhexyl Olivate																					
Hexyldecyl Ester of Hydrolyzed Collagen																					
Hexyldodecyl/Octyldecyl Hydroxystearate																					
Hydrogenated Castor Oil Behenyl Esters																					
Hydrogenated Castor Oil Cetyl Esters																					
Hydrogenated Castor Oil Stearyl Esters																					
Hydrogenated Ethylhexyl Olivate																					
Hydrogenated Ethylhexyl Sesamate																					
Hydrogenated Isocetyl Olivate																					

Alkyl Esters Data Profile – **by chain length/structure** – March 2012 – Writer, Monice Fiume																					
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Hydrogenated Isopropyl Jojobate																					
Isobutyl Tallowate																					
Isooctyl Caprylate/Caprate																					
Isooctyl Tallate																					
Isopropyl Avocadate																					
Isopropyl Babassuate																					
Isopropyl Jojobate																					
Isopropyl Tallowate																					
Isostearyl Avocadate																					
Lauryl Carpotroche Brasiliensis Seedate																					
Lauryl Theobroma Grandiflorum Seedate																					
Myristyl Carpotroche Brasiliensis Seedate																					
Myristyl Theobroma Grandiflorum Seedate																					
Octyldodecyl Avocadoate																					
Octyldodecyl Beeswax																					
Octyldodecyl Meadowfoamate																					
Octyldodecyl Olivate																					
Octyldodecyl Safflowerate																					
Stearyl Beeswax																					
Tetradecylpropionates																					
Previously Reviewed Alkyl Esters																					
Cetearyl Ethylhexanoate	1982*	X				X	X	X	X						X	X	X	X	X	X	X
Cetyl Palmitate	1982*	X				X	X		X	X					X	X		X	X	X	X
Ethylhexyl Palmitate	1982*					X	X		X						X	X		X			X
Isopropyl Palmitate	1982*	X				X	X	X	X						X			X	X	X	X
Decyl Oleate	1982*		X				X								X	X		X	X		X
Isodecyl Oleate	1982*		X				X								X	X		X			X
Butyl Stearate	1985*	X					X			X		X			X	X		X	X	X	X
Cetyl Stearate	1985*																	X	X		
Ethylhexyl Stearate	1985*						X								X			X	X	X	X
Isobutyl Stearate	1985*			X								X			X			X	X	X	
Isocetyl Stearate	1985*						X								X	X		X	X	X	X
Isopropyl Stearate	1985*						X											X	X		X
Myristyl Stearate	1985*						X								X			X			X
Isostearyl Neopentanoate	1985*		X				X			X					X	X	X	X	X	X	X
Arachidyl Propionate	1990*		X			X	X			X					X	X		X	X	X	X
Isopropyl Isostearate	1992*	X													X						X
Cetyl Ricinoleate	2007						X								X						
Isopropyl Ricinoleate	2007																				
Octyldodecyl Ricinoleate	2007																				
Butyl Myristate	2010		X	X		X	X		X						X	X					X
Cetyl Myristate	2010																				
Decyl Myristate	2010																				
Ethylhexyl Myristate	2010																				
Isobutyl Myristate	2010																				
Isocetyl Myristate	2010		X																		
Isodecyl Myristate	2010																				
Isopropyl Myristate	2010	X	X	X		X			X				X	X	X	X		X	X	X	X
Isostearyl Myristate	2010																				
Isotridecyl Myristate	2010																		X		
Lauryl Myristate	2010																				
Myristyl Myristate	2010	X				X	X								X	X					X
Octyldodecyl Myristate	2010		X																		
Oleyl Myristate	2010																				
Tetradecyloctadecyl Myristate	2010																				
Tridecyl Myristate	2010																				
Cetearyl Isononanoate	2010		X									X							X		
Cetearyl Nonanoate	2010					X	X						X		X	X		X	X		X
Cetyl Isononanoate	2010						X						X		X	X		X			X
Ethylhexyl Isononanoate	2010												X						X		

Alkyl Esters Data Profile – **by chain length/structure** – March 2012 – Writer, Monice Fiume																					
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Ethylhexyl Pelargonate	2010						X								X						X
Isobutyl Perlargonate	2010																				
Isodecyl Isononanoate	2010																	X	X		
Isononyl Isononanoate	2010		X						X	X			X		X			X	X		X
Isostearyl Isononanoate	2010																				
Isotridecyl Isononanoate	2010																				
Tridecyl Isononanoate	2010																				
Stearyl Behenate	2010																				
Stearyl Caprylate	2010																				
Stearyl Heptanoate	2010						X						X		X	X		X	X		X
Stearyl Olivate	2010																				
Stearyl Palmitate	2010																				
Stearyl Stearate	2010																				
Decyl Cocoate	2011																				
Ethylhexyl Cocoate	2011																				
Isodecyl Cocoate	2011																				
Lauryl Cocoate	2011																				
Octyldodecyl Cocoate	2011																				
Tridecyl Cocoate	2011																				
Alcohols																					
Batyl Alcohol	2011		X	X									X								
Behenyl Alcohol	1988*		X				X														X
Butyl Alcohol	2008		X	X		X	X	X		X	X	X	X					X	X		X
Cetearyl Alcohol	1988*	X	X												X			X	X		X
Cetyl Alcohol	1988*	X	X	X		X	X	X	X				X		X			X	X	X	X
Cetyl Glycol	2011																				
Chimyl Alcohol	2011	X	X	X	X		X						X		X						X
Coconut Alcohol	2011		X																		
Isopropyl Alcohol	2010			X							X	X	X	X					X		X
Isostearyl Alcohol	1988		X				X								X	X		X	X		X
Jojoba Alcohol	2008		X				X		X				X		X	X		X		X	X
Myristyl Alcohol	1988		X			X	X	X							X			X	X	X	X
Octyl Dodecanol	1985		X			X	X								X			X	X	X	X
Oleyl Alcohol	1985	X	X	X			X								X			X	X	X	X
Stearyl Alcohol	1985	X	X	X			X		X				X		X	X		X	X		X
Not Reviewed, but data were included in the Appendix to the Dicarboxylic Acid Rpt																					
Caprylic Acid															X			X			
Decyl Alcohol																		X			
Ethylhexyl Alcohol												X	X		X						X
Hexyl Alcohol																X					X
Isobutyl Alcohol											X										
Isodecyl Alcohol												X									
Isooctyl Alcohol										X		X	X	X							
Propyl Alcohol												X						X			
Acids																					
Adipic Acid	2010			X						X	X	X	X	X	X	X					X
Babassu Acid	2011																				
Coconut Acid	2011		X												X						X
Hydroxystearic Acid	1998	X	X	X						X		X	X	X				X			
Hydrolyzed Collagen	1985*		X				X		X						X	X	X	X	X	X	X
Isostearic Acid	1983*	X	X				X								X			X	X	X	X
Lauric Acid	1987*	X	X			X							X	X	X				X		X
Myristic Acid	2010	X	X			X									X			X			X
Oleic Acid	1987*	X	X	X	X	X				X			X	X	X	X		X	X	X	X
Palm Acid	2011																				
Palmitic Acid	1987*	X	X		X	X				X				X	X			X	X	X	X
Rice Bran Acid	2011																				
Safflower Acid	2011																				
Sorbic Acid	1988*		X	X			X		X	X			X	X	X	X		X	X		X
Stearic Acid	1987	X	X	X	X	X				X			X	X	X			X	X	X	X
Tall Oil Acid	2009	X					X			X		X	X					X	X	X	

*indicates that the conclusion was reaffirmed at a later time

Alkyl Esters Data Profile – **grouped by acid moiety** – March 2012 – Writer, Monice Fiume																					
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Cetyl Esters	1997	X					X								X						X
Proposed Add-Ons																					
Ethylhexyl Adipate/Palmitate/Stearate																					
Erucyl Arachidate																					
Isopropyl Arachidate			X																		
Oleyl Arachidate			X																		
Butyl Avocadate																					
Isopropyl Avocadate																					
Isostearyl Avocadate																					
Octyldodecyl Avocadoate																					
Butyl Babassuate																					
Cetyl Babassuate																					
Isopropyl Babassuate																					
Behenyl Beeswax																					
Behenyl/Isostearyl Beeswax																					
Butyloctyl Beeswax																					
C14-30 Alkyl Beeswax																					
C18-38 Alkyl Beeswax																					
C30-50 Alkyl Beeswax																					
Octyldodecyl Beeswax																					
Stearyl Beeswax																					
Arachidyl Behenate																					
Behenyl Behenate																					
Butyloctyl Behenate																					
C20-40 Alkyl Behenate																					
Cetearyl Behenate																					
Cetyl Behenate			X																		
Isocetyl Behenate																					
Isolauryl Behenate																					
Isopropyl Behenate																					
Isostearyl Behenate																					
Lauryl Behenate			X																		
Octyldodecyl Behenate																					
Tetradecyloctadecyl Behenate																					
Tridecyl Behenate																					
Caprylyl Butyrate																					
C18-38 Alkyl C24-54 Acid Ester																					
Ethylhexyl C10-40 Isoalkyl Acidate																					
C10-40 Isoalkyl Acid Octyldodecanol Esters																					
Butyloctyl Candelillate																					
Cetearyl Candelillate																					
Cetyl Caprate																					
Caprylyl Caprylate																					
Cetyl Caprylate																					
Coco-Caprylate																					
Propylheptyl Caprylate						X	X			X			X		X	X		X			X
Coco-Caprylate/Caprate																					
Isooctyl Caprylate/Caprate																					
Isohexyl Caprate																					
Lauryl Carpotroche Brasiliensis Seedate																					
Myristyl Carpotroche Brasiliensis Seedate																					
Decyl Castorate																					
Hydrogenated Castor Oil Behenyl Esters																					
Hydrogenated Castor Oil Cetyl Esters																					
Hydrogenated Castor Oil Stearyl Esters																					
Butyloctyl Cetearate																					
Decyltetradecyl Cetearate																					
C4-5 Isoalkyl Cocoate																					
Cetyl Dimethyloctanoate																					

Alkyl Esters Data Profile – **grouped by acid moiety** – March 2012 – Writer, Monice Fiume																					
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Caprylyl Eicosenoate																					
Arachidyl Erucate																					
Behenyl Erucate																					
Erucyl Erucate																					
Isostearyl Erucate																					
Lignoceryl Erucate																					
Octyldodecyl Erucate																					
Oleyl Erucate																					
Stearyl Erucate																					
Tridecyl Erucate																					
C12-13 Alkyl Ethylhexanoate																					
C12-15 Alkyl Ethylhexanoate																					
C14-18 Alkyl Ethylhexanoate																					
Cetyl Ethylhexanoate															X			X			
Decyltetradecyl Ethylhexanoate																					
Ethylhexyl Ethylhexanoate			X																		
Hexyldecyl Ethylhexanoate																					
Isocetyl Ethylhexanoate																					
Isodecyl Ethylhexanoate																					
Isostearyl Ethylhexanoate																					
Lauryl Ethylhexanoate																					
Myristyl Ethylhexanoate																					
Octyldodecyl Ethylhexanoate																					
Stearyl Ethylhexanoate																					
Tridecyl Ethylhexanoate																					
Decyl Hempseedate																					
Hexyldecyl Hexyldecanoate																					
Tetradecyloctadecyl Hexyldecanoate																					
Ethylhexyl Hydroxystearate																					
Heptylundecyl Hydroxystearate																					
Hexyldodecyl/Octyldecyl Hydroxystearate																					
Hydroxyoctacosanyl Hydroxystearate																					
Isodecyl Hydroxystearate																					
Isopropyl Hydroxystearate																					
Isostearyl Hydroxystearate																					
Octyldodecyl Hydroxystearate																					
Hexyldecyl Ester of Hydrolyzed Collagen																					
Isocetyl Isodecanoate																					
Ethylhexyl Isopalmitate																					
Batyl Isostearate																					
Behenyl Isostearate																					
Butyl Isostearate																					
Chimyl Isostearate																					
Decyl Isostearate																					
Ethylhexyl Isostearate																					
Hexyldecyl Isostearate																					
Hexyl Isostearate																					
Hydroxycetyl Isostearate																					
Isocetyl Isostearate																					
Isostearyl Isostearate					X																
Lauryl Isostearate																					
Myristyl Isostearate																					
Octyldodecyl Isostearate																					
Decyl Jojobate																					
Hydrogenated Isopropyl Jojobate																					
Isopropyl Jojobate																					
Cetyl Laurate																					
Decyl Laurate																					
Ethylhexyl Laurate			X			X	X	X		X			X		X	X		X			X
Hexyldecyl Laurate																					
Hexyl Laurate																					
Isocetyl Laurate																					

Alkyl Esters Data Profile – **grouped by acid moiety** – March 2012 – Writer, Monice Fiume																						
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Isodecyl Laurate							X			X			X		X	X					X
Isohexyl Laurate																					
Isostearyl Laurate																					
Isotridecyl Laurate																					
Isopropyl Laurate			X																		
Lauryl Laurate																					
Myristyl Laurate			X																		
Tridecyl Laurate																					
Isopropyl Linoleate	1992	X					X								X						X
Isostearyl Linoleate																					
Oleyl Linoleate																					
Stearyl Linoleate																					
Octyldodecyl Meadowfoamate																					
Octyldodecyl Neodecanoate																					
Ethylhexyl Neopentanoate																					
Isodecyl Neopentanoate																					
Isohexyl Neopentanoate																					
Myristyl Neopentanoate																					
Octyldodecyl Neopentanoate																					
Tridecyl Neopentanoate																					
Octyldodecyl Octyldodecanoate																					
Butyl Oleate			X			X	X												X		
Butyloctyl Oleate																					
Cetyl Oleate			X	X																	
Ethylhexyl Oleate			X																		
Erucyl Oleate																					
Hexyldecyl Oleate																					
Isopropyl Oleate			X																		
Lauryl Oleate			X																		
Octyldecyl Oleate																					
Octyldodecyl Oleate																					
Oleyl Oleate			X																		
Behenyl Olivate																					
Cetearyl Olivate																					
Decyl Olivate																					
Ethylhexyl Olivate																					
Hydrogenated Ethylhexyl Olivate																					
Hydrogenated Isocetyl Olivate																					
Octyldodecyl Olivate																					
Cetearyl Palmate																					
Butyloctyl Palmitate																					
Cetearyl Palmitate																					
Decyl Palmitate																					
Hexyldecyl Palmitate																					
Isobutyl Palmitate																					
Isocetyl Palmitate																					
Isodecyl Palmitate																					
Isohexyl Palmitate																					
Isostearyl Palmitate																					
Lauryl Palmitate			X																		
Coco-Rapeseedate																					
Cetearyl Rice Branate																					
Octyldodecyl Safflowerate																					
Hydrogenated Ethylhexyl Sesamate																					
Isopropyl Sorbate																					
Batyl Stearate																					
C16-36 Alkyl Stearate																					
C20-40 Alkyl Stearate																					
C30-50 Alkyl Stearate																					
C40-60 Alkyl Stearate																					
Cetearyl Stearate																					
Chimyl Stearate																					
C32-36 Isoalkyl Stearate																					
Hexyldecyl Stearate																					

Alkyl Esters Data Profile – **grouped by acid moiety** – March 2012 – Writer, Monice Fiume																					
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Isodecyl Stearate																					
Isotridecyl Stearate																					
Lauryl Stearate																					
Octyldodecyl Stearate																					
Oleyl Stearate			X																		
Tetradecyleicosyl Stearate																					
Tetradecyloctadecyl Stearate																					
Tridecyl Stearate																					
Isooctyl Tallate																					
Cetyl Tallowate																					
Isobutyl Tallowate																					
Isopropyl Tallowate																					
Tetradecylpropionates																					
Lauryl Theobroma Grandiflorum Seedate																					
Myristyl Theobroma Grandiflorum Seedate																					
Heptyl Undecylenate																					
Previously Reviewed Alkyl Esters																					
Stearyl Behenate	2010																				
Stearyl Caprylate	2010																				
Decyl Cocoate	2011																				
Ethylhexyl Cocoate	2011																				
Isodecyl Cocoate	2011																				
Lauryl Cocoate	2011																				
Octyldodecyl Cocoate	2011																				
Tridecyl Cocoate	2011																				
Cetearyl Ethylhexanoate	1982*	X				X	X	X	X						X	X	X	X	X	X	X
Stearyl Heptanoate	2010						X						X		X	X		X	X		X
Cetearyl Isononanoate	2010		X									X							X		
Cetyl Isononanoate	2010						X						X		X	X		X			X
Ethylhexyl Isononanoate	2010												X						X		
Isodecyl Isononanoate	2010																	X	X		
Isononyl Isononanoate	2010		X						X	X			X		X			X	X		X
Isostearyl Isononanoate	2010																				
Isotridecyl Isononanoate	2010																				
Tridecyl Isononanoate	2010																				
Isopropyl Isostearate	1992*	X													X						X
Butyl Myristate	2010		X	X		X	X		X						X	X					X
Cetyl Myristate	2010																				
Decyl Myristate	2010																				
Ethylhexyl Myristate	2010																				
Isobutyl Myristate	2010																				
Isocetyl Myristate	2010		X																		
Isodecyl Myristate	2010																				
Isopropyl Myristate	2010	X	X	X		X			X				X	X	X	X		X	X	X	X
Isostearyl Myristate	2010																				
Isotridecyl Myristate	2010																		X		
Lauryl Myristate	2010																				
Myristyl Myristate	2010	X				X	X								X	X					X
Octyldodecyl Myristate	2010		X																		
Oleyl Myristate	2010																				
Tetradecyloctadecyl Myristate	2010																				
Tridecyl Myristate	2010																				
Isostearyl Neopentanoate	1985*		X				X			X					X	X	X	X	X	X	X
Cetearyl Nonanoate	2010					X	X						X		X	X		X	X		X
Decyl Oleate	1982*		X				X								X	X		X	X		X
Isodecyl Oleate	1982*		X				X								X	X		X			X
Stearyl Olivate	2010																				
Cetyl Palmitate	1982*	X				X	X		X	X					X	X		X	X	X	X
Ethylhexyl Palmitate	1982*					X	X		X						X	X		X			X
Isopropyl Palmitate	1982*	X				X	X	X	X						X			X	X	X	X
Stearyl Palmitate	2010																				
Ethylhexyl Pelargonate	2010						X								X						X

Alkyl Esters Data Profile – **grouped by acid moiety** – March 2012 – Writer, Monice Fiume																					
	Year Reviewed	Composition/Constituents/Impurities	Methods of Mfg	Toxicokinetics	Dermal Penetration	Acute Tox-Derm	Acute Tox-Oral	Acute Tox-Inhal	Rptd Dose-Derm	Rpted Dose-Oral	Rptd Dose-Inhal	Repro/Dev Tox	Genotoxicity	Carcinogenicity	Derm Irritation-Non-Human	Derm Sensitization Non-Human	Phototox-Non_Animal	Derm Irritation-Human	Derm Sensitization Human	Phototox - Human	Ocular Irritation
Isobutyl Perlargonate	2010																				
Arachidyl Propionate	1990*		X			X	X			X					X	X		X	X	X	X
Cetyl Ricinoleate	2007						X								X						
Isopropyl Ricinoleate	2007																				
Octyldodecyl Ricinoleate	2007																				
Butyl Stearate	1985*	X					X			X		X			X	X		X	X	X	X
Cetyl Stearate	1985*																	X	X		
Ethylhexyl Stearate	1985*						X								X			X	X	X	X
Isobutyl Stearate	1985*			X								X			X			X	X	X	
Isocetyl Stearate	1985*						X								X	X		X	X	X	X
Isopropyl Stearate	1985*						X											X	X		X
Myristyl Stearate	1985*						X								X			X			X
Stearyl Stearate	2010																				
Acids																					
Adipic Acid	2010			X						X	X	X	X	X	X	X					X
Babassu Acid	2011																				
Coconut Acid	2011		X												X						X
Hydroxystearic Acid	1998	X	X	X						X		X	X	X				X			
Hydrolyzed Collagen	1985*		X				X		X						X	X	X	X	X	X	X
Isostearic Acid	1983*	X	X				X								X			X	X	X	X
Lauric Acid	1987*	X	X			X							X	X	X				X		X
Myristic Acid	2010	X	X			X									X			X			X
Oleic Acid	1987*	X	X	X	X	X				X			X	X	X	X		X	X	X	X
Palm Acid	2011																				
Palmitic Acid	1987*	X	X		X	X				X				X	X			X	X	X	X
Rice Bran Acid	2011																				
Safflower Acid	2011																				
Sorbic Acid	1988*		X	X			X		X	X			X	X	X	X		X	X		X
Stearic Acid	1987	X	X	X	X	X				X			X	X	X			X	X	X	X
Tall Oil Acid	2009	X					X			X		X	X					X	X	X	
Alcohols																					
Batyl Alcohol	2011		X	X									X								
Behenyl Alcohol	1988*		X				X														X
Butyl Alcohol	2008		X	X		X	X	X		X	X	X	X					X	X		X
Cetearyl Alcohol	1988*	X	X												X			X	X		X
Cetyl Alcohol	1988*	X	X	X		X	X	X	X				X		X			X	X	X	X
Cetyl Glycol	2011																				
Chimyl Alcohol	2011	X	X	X	X		X						X		X						X
Coconut Alcohol	2011		X																		
Isopropyl Alcohol	2010			X							X	X	X	X					X		X
Isostearyl Alcohol	1988		X				X								X	X		X	X		X
Jojoba Alcohol	2008		X				X		X				X		X	X		X		X	X
Myristyl Alcohol	1988		X			X	X	X							X			X	X	X	X
Octyl Dodecanol	1985		X			X	X								X			X	X	X	X
Oleyl Alcohol	1985	X	X	X			X								X			X	X	X	X
Stearyl Alcohol	1985	X	X	X			X		X				X		X	X		X	X		X
Not Reviewed, but data were included in the Appendix to the Dicarboxylic Acid Rpt																					
Caprylic Acid															X			X			
Decyl Alcohol																		X			
Ethylhexyl Alcohol												X	X		X						X
Hexyl Alcohol																X					X
Isobutyl Alcohol											X										
Isodecyl Alcohol												X									
Isooctyl Alcohol										X		X	X	X							
Propyl Alcohol												X						X			

*indicates that the conclusion was reaffirmed at a later time

Initial Search Strategy – Alkyl Esters Re-Review – Sci Finder Search

Keep Me Posted updates are received weekly

Dec 2011/Jan 2012 – 1638 abstracts found for review using qualifiers; 54 papers ordered
Created Keep Me Posted alert

The following were searched in SciFinder

Cetyl Esters
Arachidyl Behenate
42233-14-7
Arachidyl Erucate
86601-86-7
Arbutinyl Undecylenate
Batyl Isostearate
Batyl Stearate
13232-26-3
Behenyl Beeswax
Behenyl Behenate
17671-27-1
Behenyl Erucate
18312-32-8
Behenyl Isostearate
Behenyl/Isostearyl Beeswax
Behenyl Olivate
Butyl Avocadate
Butyl Babassuate
Butyl Isostearate
121336-68-3
Butyl Oleate
142-77-8
Butyloctyl Beeswax
Butyloctyl Behenate
Butyloctyl Candelillate
101227-08-1
Butyloctyl Cetearate
101227-08-1
Butyloctyl Oleate
Butyloctyl Palmitate
C14-30 Alkyl Beeswax
C18-38 Alkyl Beeswax
C30-50 Alkyl Beeswax
C20-40 Alkyl Behenate
C18-38 Alkyl C24-54 Acid Ester
C12-13 Alkyl Ethylhexanoate
90411-66-8
C12-15 Alkyl Ethylhexanoate
90411-66-8
C14-18 Alkyl Ethylhexanoate
C16-36 Alkyl Stearate
C20-40 Alkyl Stearate
C30-50 Alkyl Stearate
C40-60 Alkyl Stearate
Caprylyl Butyrate
110-39-4
Caprylyl Caprylate
2306-88-9
Caprylyl Eicosenoate
Cetearyl Behenate
Cetearyl Candelillate
Cetearyl Olivate
Cetearyl Palmate
Cetearyl Palmitate
85341-79-3
Cetearyl Rice Branate
Cetearyl Stearate
93820-97-4
Cetyl Babassuate
Ceetyl Behenate
Cetyl Caprate
Cetyl Caprylate
29710-31-4
Cetyl Dimethyloctanoate
Cetyl Ethylhexanoate
59130-69-7
Cetyl Laurate
20834-06-4
Cetyl Oleate
22393-86-8
Cetyl Tallowate
Chimyl Isostearate
Chimyl Stearate
131932-18-8
C10-40 Isoalkyl Acid Octyldodecanol Esters
C4-5 Isoalkyl Cocoate
C32-36 Isoalkyl Stearate
68201-22-9
Coco-Caprylate
Coco-Caprylate/Caprate
Coco-Rapeseedate
Decyl Castorate
Decyl Hempseedate
Decyl Isostearate
84605-08-3
Decyl Jojobate
Decyl Laurate
36528-28-6
Decyl Olivate
Decyl Palmitate
42232-27-9
Decyltetradecyl Cetearate
97404-34-7
Decyltetradecyl Ethylhexanoate
Ethylhexyl Adipate/Palmitate/Stearate
Ethylhexyl C10-40 Isoalkyl Acidate
Ethylhexyl Ethylhexanoate
7425-14-1
Ethylhexyl Hydroxystearate
29383-26-4
29710-25-6
Ethylhexyl Isopalmitate
93843-32-4
Ethylhexyl Isostearate
81897-25-8

85186-76-1
Ethylhexyl Laurate
20292-08-4
Ethylhexyl Neopentanoate
Ethylhexyl Oleate
Ethylhexyl Olivate
Erucyl Arachidate
Erucyl Erucate
27640-89-7
84605-12-9
Erucyl Oleate
85617-81-8
Heptyl Undecylenate
68141-27-5
Heptylundecyl Hydroxystearate
Hexyldecyl Ester of Hydrolyzed Collagen
169590-83-4
Hexyldecyl Ethylhexanoate
Hexyldecyl Hexyldecanoate
Hexyldecyl Isostearate
Hexyldecyl Laurate
34362-27-1
Hexyldecyl Oleate
94278-07-6
Hexyldecyl Palmitate
69275-02-1
Hexyldecyl Stearate
Hexyldodecyl/Octyldecyl Hydroxystearate
Hexyl Isostearate
94247-25-3
Hexyl Laurate
34316-64-8
Hydrogenated Castor Oil Behenyl Esters
Hydrogenated Castor Oil Cetyl Esters
438551-45-2
Hydrogenated Castor Oil Stearyl Esters
438551-44-1
Hydrogenated Ethylhexyl Olivate
Hydrogenated Ethylhexyl Sesamate
Hydrogenated Isocetyl Olivate
Hydrogenated Isopropyl Jojobate
Hydroxycetyl Isostearate
Hydroxyoctacosanyl Hydroxystearate
93840-71-2
Isoamyl Laurate
6309-51-9
Isobutyl Palmitate
110-34-9
Isobutyl Tallowate
68526-50-1
Isocetyl Behenate
Isocetyl Ethylhexanoate
125804-19-5
Isocetyl Isodecanoate
129588-05-2
Isocetyl Isostearate
52006-45-8
Isocetyl Laurate
89527-28-6
Isocetyl Palmitate
127770-27-8
Isodecyl Ethylhexanoate
89933-26-6
Isodecyl Hydroxystearate
29383-27-5
Isodecyl Laurate
14779-93-2
94247-10-6
Isodecyl Neopentanoate
60209-82-7
Isodecyl Palmitate
14779-95-4
59231-33-3
Isodecyl Stearate
31565-38-5
Isohexyl Caprate
138208-67-0
Isohexyl Laurate
59219-73-7
Isohexyl Neopentanoate
131141-70-3
150588-62-8
Isohexyl Palmitate
55194-91-7
Isolauryl Behenate
Isooctyl Caprylate/Caprate
Isooctyl Tallate
Isopropyl Arachidate
26718-90-1
Isopropyl Avocadate
90990-05-9
Isopropyl Babassuate
Isopropyl Behenate
26718-95-6
Isopropyl Hydroxystearate
Isopropyl Jojobate
Isopropyl Laurate
10233-13-3
Isopropyl Linoleate
22882-95-7
Isopropyl Oleate
Isopropyl Sorbe
112-11-8
17364-07-7
Isopropyl Sorbate
Isopropyl Tallowate
Isostearyl Avocadate
90990-06-0
Isostearyl Behenate
125804-16-2
Isostearyl Erucate
84605-10-7
Isostearyl Ethylhexanoate
Isostearyl Hydroxystearate
162888-05-3
Isostearyl Isostearate
41669-30-1
Isostearyl Laurate
72576-79-5
Isostearyl Linoleate
127358-80-9
Isostearyl Palmitate

69247-83-2
72576-80-8
Isotridecyl Laurate
94134-83-5
Isotridecyl Stearate
31565-37-4
Lauryl Behenate
42233-07-8
Lauryl Carpotroche Brasiliensis Seedate
Lauryl Ethylhexanoate
56078-38-7
Lauryl Isostearate
93803-85-1
Lauryl Laurate
13945-76-1
Lauryl Oleate
36078-10-1
Lauryl Palmitate
42232-29-1
Lauryl Stearate
5303-25-3
Lauryl Theobroma Grandiflorum Seedate
Lignoceryl Erucate
Myristyl Carpotroche Brasiliensis Seedate
Myristyl Ethylhexanoate
Myristyl Isostearate
94247-26-4
Myristyl Laurate
22412-97-1
Myristyl Neopentanoate
144610-93-5
Myristyl Theobroma Grandiflorum Seedate
Octyldecyl Oleate
Octyldodecyl Avocadoate
Octyldodecyl Beeswax
Octyldodecyl Behenate
125804-08-2
Octyldodecyl Erucate
88103-59-7
Octyldodecyl Ethylhexanoate
69275-04-3
Octyldodecyl Hydroxystearate
Octyldodecyl Isostearate
93803-87-3
Octyldodecyl Meadowfoamate
Octyldodecyl Neodecanoate
Octyldodecyl Neopentanoate
Octyldodecyl Octyldodecanoate
Octyldodecyl Oleate
22801-45-2
Octyldodecyl Olivate
22801-45-2
Octyldodecyl Safflowerate
Octyldodecyl Stearate
22766-82-1
Oleyl Arachidate
22393-96-0
156952-79-3
Oleyl Erucate
17673-56-2
143485-69-2
Oleyl Linoleate
17673-59-5
Oleyl Oleate
3687-45-4
17363-94-9
Oleyl Stearate
17673-50-6
33057-39-5
Propylheptyl Caprylate
868839-23-0
Stearyl Beeswax
Stearyl Erucate
86601-84-5
96810-34-3
Stearyl Ethylhexanoate
59130-70-0
Stearyl Linoleate
17673-53-9
Tetradecyleicosyl Stearate
Tetradecyloctadecyl Behenate
Tetradecyloctadecyl Hexyldecanoate
93982-00-4
Tetradecyloctadecyl Stearate
Tetradecylpropionates
Tridecyl Behenate
42233-08-9
Tridecyl Erucate
131154-74-0
Tridecyl Ethylhexanoate
Tridecyl Laurate
36665-67-5
Tridecyl Neopentanoate
106436-39-9
Tridecyl Stearate
31556-45-3

Other search sites - Jan 2012
searched ChemPortal; NTP, IARC, EU, FDA – spme hjits in Chem Portal, 0 in NTP and IARC

Report

Re-Review

Alkyl Esters as Used in Cosmetics

March 5, 2012

The 2012 Cosmetic Ingredient Review Expert Panel members are: Chair, Wilma F. Bergfeld, M.D., F.A.C.P.; Donald V. Belsito, M.D.; Ronald A Hill, Ph.D.; Curtis D. Klaassen, Ph.D.; Daniel C. Liebler, 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 Monice M. Fiume, Senior Scientific Analyst/Writer.

© Cosmetic Ingredient Review
1101 17th Street, NW, Suite 412 ♢ Washington, DC 20036-4702 ♢ ph 202.331.0651 ♢ fax 202.331.0088 ♢
cirinfo@cir-safety.org

TABLE OF CONTENTS

Introduction 3
Chemistry 3
Definition and Structure 3
Methods of Manufacture 3
Physical and Chemical Properties 4
Impurities 4
Use 4
Cosmetic 4
Non-Cosmetic 5
Toxicokinetics 5
Absorption, Distribution, Metabolism, and Excretion 5
Dermal Penetration 5
Penetration Enhancement 6
Animal Toxicology 6
Single Dose (Acute) Toxicity 6
Dermal 6
Oral 6
Inhalation 7
Repeated Dose Toxicity 7
Oral 7
Genotoxicity 7
In Vitro 7
In Vivo 8
Carcinogenicity 8
Irritation and Sensitization 8
Dermal Irritation 8
Non-Human 8
Human 9
Sensitization 9
Non-Human 9
Human 10
Ocular Irritation 10
MIscellaneous Effects 10
Dermal Effects 10
Summary 10
Figures 12
Figure 1. Figures ordered by chain length, chemical structure 12
Tables 33
Table 1a. Alkyl Esters Group (presented alphabetically) 33
Table 1b. Alkyl Esters Group (grouped by whether individual constituents have been reviewed) 34
Table 2. Alkyl Esters Previously Reviewed in Other Safety Assessments 35
Table 3a. Conclusions of previously reviewed constituents 35
Table 3b. Conclusions of previously reviewed alkyl esters (year issued) 36
Table 4. Definitions and functions 37
Table 5. Methods of Manufacture 42
Table 6. Chemical and physical properties 43
Table 7a. Frequency and concentration of use according to duration and type of exposure 50
Table 7b. Ingredients not reported to be used 55
Table 8. Examples of non-cosmetic uses 56
References 57

INTRODUCTION

Cetyl esters, a synthetic wax composed of a mixture of esters of saturated fatty acids and fatty alcohols with carbon chain lengths between 14 and 18, was reviewed previously by the Cosmetic Ingredient Review Expert Panel. In 1997, the Panel concluded the cetyl esters is safe as used in cosmetics.[1] Because it has been 15 years since cetyl esters has been reviewed, it is being presented for consideration for re-review.

Cetyl esters is a member of a broader group of cosmetic ingredients, the alkyl esters, and 200 alkyl esters are being presented as possible "add-on ingredients" to this re-review. The ingredients included in the alkyl esters family consist of the reaction products of fatty acids and alcohols. (Many of these individual constituents have been reviewed previously by the CIR.) The ingredients being proposed for inclusion are listed in Table 1a (alphabetically) and Table 1b (grouped by whether or not individual constituents have been reviewed). One of the listed add-ons, isopropyl linoleate, was reviewed by the CIR in 1992 but not yet presented for re-review.[2] In the original safety assessment, the Panel concluded that the data were insufficient to support the safety of isopropyl linoleate as used in cosmetics.

The alkyl esters are reported to function in cosmetics as skin conditioning agents, with some have additional reported functions. Notable exceptions are described in the cosmetic use section of this assessment.

An additional 58 alkyl esters have recently been reviewed in other safety assessments or considered for re-review; not all of these re-reviews were opened. These ingredients, which are not being presented as potential add-ons, are listed in Table 2.

An examination of past safety assessments illustrates that the CIR has often been able to extrapolate data from existing CIR safety assessments on similar chemicals or on constituent ingredients when making a determination of safety. The original cetyl esters report, as well as the safety assessment on alkyl PEG ethers, are just two examples of reports that have relied on data extrapolation. Conclusions from the safety assessments on individual constituents are provided in Table 3a. Additionally, conclusions from the safety assessments on the 58 alkyl esters that were previously reviewed by the CIR are provided in Table 3b.

CHEMISTRY

Definition and Structure

The ingredients in this review are alkyl esters. In other words, the core relationship between these ingredients is a carboxyl ester functional group flanked on both sides by alkyl chains. Some of these alkyl chains are straight and some are branched.

Cetyl Esters

> *Cetyl esters (synonymous with synthetic spermaceti wax) is a commercial cetyl esters preparation comprised of a mixture of one or more of the following esters: cetyl palmitate, myristyl myristate, cetyl stearate, myristyl stearate, cetyl myristate, and stearyl stearate.*[1] (All of these esters have been found safe as used by the CIR.[3-7])
>
> *From the Final Report on the Safety Assessment of Cetyl Esters*[1]

Isopropyl Linoleate

> *Isopropyl linoleate is a mixture consisting of 64-82% isopropyl linoleate, 0.6% (max.) isopropyl myristate, 2-9% isopropyl palmitate, 3% (max) isopropyl stearate, 9-25% isopropyl oleate, and 1.75% (max.) free linoleic acid.*[2] (Isopropyl myristate, isopropyl palmitate, and isopropyl stearate have been found safe as used by the CIR;[3-6] isopropyl oleate and linoleic acid have not been reviewed.)
>
> *From the Final Report on the Safety Assessment of Isopropyl Linoleate*[2]

The structures of the ingredients included in this report are depicted in Figure 1, which follows the text of this assessment. Definitions and structures for cetyl esters and the potential add-on ingredients are provided in Table 4.

Methods of Manufacture

Most of these alkyl esters are produced synthetically via classical Fischer type esterification methods (i.e., reaction of a carboxylic acid with an alcohol to produce a carboxylic ester), although the reaction may be promoted by acid or base catalysis, or by the use of an acid chloride (Figure 2).

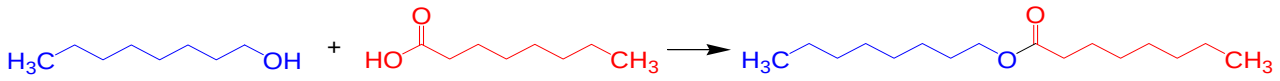


Figure 2. Synthesis of capryl caprylate from capryl alcohol and caprylic acid

However, some of the natural source ingredients in this review may be produced by transesterification (i.e., trading a source material ester starting material for a new ester product). For example, the triglycerides (i.e., glyceryl tri-**esters**) in natural oils can be reacted with alcohols to produce new monoesters (and diglycerides, monoglycerides, and glycerin, depending on reaction stoichiometry). Methods of manufacture are summarized in Table 5.

Physical and Chemical Properties

Alkyl esters are hydrophobic materials that range from oil, at the lowest molecular weights/shortest chain lengths, to waxy solids, at the highest molecular weights/longest chain lengths. Physical and chemical properties data are provided in Table 6

Cetyl Esters

> *Cetyl esters is a synthetic wax with a composition and properties identical to natural spermaceti wax.*[1]
> *From the Final Report on the Safety Assessment of Cetyl Esters*[1]

Impurities

According to one report, in the synthesis of oleate esters using sodium alcoholates (base catalyst), methyl oleate was the major impurity.[8]

USE

Cosmetic

The alkyl esters are reported to function in cosmetics as skin conditioning agents.[9] Some of the alkyl esters are reported to have additional functions. Most notably, lauryl and myristyl Carpotroche Brasiliensis and lauryl and myristyl Theobroma Grandiflorum seedate are reported to also function as skin bleaching agents, isocetyl tallate as a plasticizer and solvent, and tetradecylpropionates as a solvent. Isopropyl sorbate is reported to function as a preservative only, and not as a skin conditioning agent. The functions of each ingredient are provided in Table 4.

Voluntary Cosmetic Registration Program (VCRP) data obtained from the FDA in 2011 indicate that 66 of the 205 alkyl esters named in this safety assessment are currently used in cosmetic formulations. Cetyl esters has the most uses and is reported to be used in 451 cosmetic formulations; 235 of those formulations are leave-on and 216 are rinse-off.[10] Cetyl ethylhexanoate and ethylhexyl hydroxystearate are reported to be in 294 and 229 formulations, respectively. All others are used in less than 200 formulations, and most are used in less than 100 formulations. A concentration of use survey is being conducted by the Personal Care Products Council, and the information will be included once the survey is complete. Frequency of use data are provided in Table 7a, and the ingredients not in use according to the VCRP are listed in Table 7b.

Some alkyl esters are used in products that may be applied to baby skin or used near the eye area or mucous membranes. Additionally, some of the alkyl esters are used in cosmetic sprays, including hair, deodorant, body, and other spray products, and could possibly be inhaled. In practice, 95% to 99% of the droplets/particles released from cosmetic sprays have aerodynamic equivalent diameters >10 μm, with propellant sprays yielding a greater fraction of droplets/particles <10 μm compared with pump sprays.[11,12] Therefore, most droplets/particles incidentally inhaled from cosmetic sprays would be deposited in the nasopharyngeal and thoracic regions of the respiratory tract and would not be respirable (i.e., they would not enter the lungs) to any appreciable amount.[13,14] However, the potential for inhalation toxicity is not limited to respirable droplets/particles deposited in the lungs. Inhaled droplets/particles deposited in the nasopharyngeal and thoracic regions may cause toxic effects depending on their chemical and other properties. There is some evidence indicating that deodorant spray products can release substantially larger fractions

of particulates having aerodynamic equivalent diameters in the range considered to be respirable.[14] However, the information is not sufficient to determine whether significantly greater lung exposures result from the use of deodorant sprays, compared to other cosmetic sprays.

Ethylhexyl ethylhexanoate is listed in the European Union inventory of cosmetic ingredients,[15] and according to the European Chemical Substances Information System (ESIS), it has a reproductive risk classification of category 3, substances which cause concern, with risk phrase R63, possible risk of harm to the unborn child.[16] Ethylhexyl ethylhexanoate is not restricted by the European Commission, but the Scientific Committee on Consumer Safety (SCCS) is of the opinion that "the use in cosmetic products of substances classified as carcinogenic, mutagenic or toxic for reproduction, of category 1, 2 and 3, under Annex I to Directive 67/548/EEC shall be prohibited."[17] All other of the alkyl esters named in this report, with the following exceptions, are listed in the European Union inventory of cosmetic ingredients: behenyl olivate; cetyl behenate; decyl laurate; decyltetradecyl ethylhexanoate; and hexyldodecyl/octyldecyl hydroxystearate.[15]

Non-Cosmetic

Isoamyl laurate is approved as a direct food additive for use as a flavor substance adjuvant (21CFR172.515). Isobutyl palmitate (21CFR177.2260; 21CFR177.2800), isobutyl tallate (21CFR177.2600), isopropyl laurate (21CFR178.3910), and isopropyl oleate (21CFR178.3570; 178.3910) are approved indirect food additives. Examples of non-cosmetic uses of some of the alkyl esters are provided in Table 8.

TOXICOKINETICS

Absorption, Distribution, Metabolism, and Excretion

Cetyl Oleate

Groups of five male albino rats were fed a diet containing 20% cetyl oleate for 9 days; control groups were fed a fat-free diet or a diet containing 20% cottonseed oil.[18] The animals were given 12 g of diet per day. The absorption of cetyl oleate was reported to be 75.3%. By day 2 of the study, the animals fed cetyl oleate developed seborrhea, which progressively increased with feeding. The animals were killed after the termination of dosing, and microscopic examination reported thickening and hyperemia of the intestinal wall. The exuded lipid was identified as cetyl oleate. The researchers stated that the absorbability and seborrhea suggested that cetyl oleate was not hydrolyzed in the gut.

The researchers then dosed groups of six male rats with 2 g of cetyl oleate or an equal mixture of cetyl oleate + tributyrin by gavage, and the animals were fed a fat-free diet. Control animals were dosed with sucrose. The animals were fasted overnight on day 10 of dosing, and two animals were then killed. Two of the remaining animals were killed 1 h and two were killed 3 h after a final dose. Seborrhea was observed in both test groups; only cetyl oleate was recovered from the exuded lipid in both test groups. Intestinal weight was markedly increased in the cetyl oleate + tributyrin group. The free fatty acid content of the stomach 3 h after dosing and of the small intestine 1 and 3 h after dosing was increased in group dosed with cetyl oleate (only) when compared to controls. In the cetyl oleate + butyrin group, the free fatty acid content of the stomach was increased at both 1 and 3 h, and in the small intestine it was increased after 1 h.

Dermal Penetration

Isostearyl Isostearate

Pre-deuterated isostearyl isostearate, 7 µl/cm^2, was applied neat to a 2 cm x 8 cm site on the ventral forearm of 14 subjects for 3 h under non-occlusive conditions.[19] The test site was tape-stripped 3 h after application, and attenuated total reflectance-Fourier transform infrared (ATF-FTIR) spectra measurements were determined. The researchers stated the most of the isostearyl isostearate was located at the surface of the stratum corneum. (The percent recovery of the amount applied was not specified.)

Penetration Enhancement

The effect of alkyl esters on the penetration of indomethacin in vitro through excised hairless rat skin was examined.[20] The permeation of 1% indomethacin from suspensions and from hydrogenated phospholipid gels containing cetyl caprylate, cetyl ethylhexanoate, isocetyl ethylhexanoate, stearyl ethylhexanoate, ethylhexyl palmitate, isocetyl palmitate, isocetyl isostearate, or isocetyl stearate was determined. The permeation rate of indomethacin from the esters increases with increased solubility of the drug in the ester. The solubility of indomethacin in liquid paraffin is very low, and there was no permeation of indomethacin from liquid paraffin after 10 h. Permeation from the isocetyl isostearate suspension, the alkyl ester indomethacin was least soluble in but with a 60-fold increase in solubility compared to liquid paraffin, was 3.8 $\mu g/cm^2$ after 10 h. (Of the esters studied, indomethacin had the highest solubility in and permeation from ethylhexyl isononanoate, an alkyl ester previously reviewed by the CIR, with approximately 23 $\mu g/cm^2$ permeating in 10 h.) Permeation rates (and solubility) were higher in gels formed by hydrogen phospholipid than from suspensions. In all cases, a linear relationship existed between the cumulative amounts of indomethacin that permeated from any ester from 4 h to 10 h. In another study, the permeation rate of ketoprofen from an alkyl ester suspension through excised hairless rat skin was also proportional to its solubility in the suspension.[21]

Skin penetration enhancement with isostearyl isostearate was evaluated in vitro using excised human abdominal skin by measuring the permeation of 5-fluorouracil through the skin after 6 h.[22] Both isostearyl isostearate and the buffer control increased the rate of penetration of 5-fluorouracil, but isostearyl isostearate was not a penetration enhancer.

ANIMAL TOXICOLOGY

Single Dose (Acute) Toxicity

DERMAL

Butyl Oleate

The dermal toxicity of butyl oleate was determined in rabbits.[23] A single dermal dose of 5 g/kg group butyl oleate was applied to 10 rabbits. Slight erythema was observed in 3 rabbits and moderate erythema in 7, and slight edema was observed in 6 rabbits and moderate edema in 3. None of the animals died, and the dermal LD_{50} of butyl oleate in rabbits was >5 g/kg. (Additional details were not provided.)

Propylheptyl Caprylate

Groups of 5 male and 5 female Wistar rats were dosed dermally with a single semi-occlusive application of 0 or 2000 mg/kg bw propylheptyl caprylate, applied neat.[25] No irritation or treatment-related signs of toxicity were reported, and the dermal LD_{50} of propylheptyl caprylate was >2 g/kg/bw.

Ethylhexyl Laurate

The dermal LD_{50} of ethylhexyl laurate in rats was >3 g/kg bw.[24] (Details were not provided.)

ORAL

Cetyl Esters

> *The oral LD_{50} of a formulation containing 60-65% cetyl esters was >20 g/kg in mice.*[1]
> *From the Final Report on the Safety Assessment of Cetyl Esters*[1]

Butyl Oleate

A group of 10 rats were dosed orally with 5 g/kg butyl oleate.[23] None of the animals died. The oral LD_{50} of butyl oleate in rats was >5 g/kg.

Propylheptyl Caprylate

Six female Wistar rats were dosed orally with 2 g/kg bw propylheptyl caprylate in corn oil.[25] All animals had hunched posture and piloerection for 6 h after dosing, but none of the animals died during the study. The oral LD_{50} of propylheptyl caprylate was >2 mg/kg bw.

Ethylhexyl Laurate

The oral LD_{50} of ethylhexyl laurate in rats was >2 g/kg bw.[24] (Details were not provided.)

Isopropyl Linoleate

The oral LD_{50} of 10% isopropyl linoleate in corn oil was >64 cc/kg, the highest dose tested, in rats.[2]
From the Final Report on the Safety Assessment of Isopropyl Linoleate[2]

Isodecyl Laurate

The oral LD_{50} of isodecyl laurate in Wistar rats was >13 g/kg (>15 ml/kg).[26] (Details were not provided.)

INHALATION

Ethylhexyl Laurate

The inhalation LC_{50} of ethylhexyl laurate in rats was >230 ppm.[24] (Details were not provided.)

Repeated Dose Toxicity

ORAL

Propylheptyl Caprylate

Groups of 10 male and 10 female rats were dosed daily by gavage with 0, 100, 300, or 1000 mg/kg bw/day propylheptyl caprylate in soybean oil for 90 days.[25] No test-article related deaths occurred. No test-article related clinical signs of toxicity or changes in body weights of feed consumption, changes in the estrus cycle, or effects on sperm were observed, and there were no effects on any clinical chemistry or hematology parameters. A statistically significant decrease in the urinary pH values was considered test-article related. Absolute and relative liver weights were statistically significantly increased in animals of the high dose group. The change in urinary pH was attributed to the possibility that an acidic metabolite being eliminated in large doses, and the changes in liver weight were considered a non-specific adaptive change to the liver workload at the high does, therefore, the NOAEL was established as ≥1000 mg/mg bw/day propylheptyl caprylate.

Ethylhexyl Laurate

Male and female Sprague-Dawley rats, number per group not specified, were dosed with 0, 100, 300, or 1000 mg/kg bw ethylhexyl laurate once daily, 5 days/wk, by gavage for 28 days.[24] The no-observable adverse-effect level (NOAEL) was 1000 mg/kg bw. (No additional details were provided.)

Isodecyl Laurate

Male Wistar rats, number per group not specified, were dosed orally with 500, 1500, or 4500 mg/kg/day isodecyl laurate, 6 days/wk, for 4 wks.[26] No treatment related changes were observed at any dose level. (No additional details were provided.)

GENOTOXICITY

In Vitro

Propylheptyl Caprylate

The mutagenic potential of 0.31, 0.62, 1.25, 2.5, and 5.0 µl/plate propylheptyl caprylate was evaluated in an Ames test, with and without metabolic activation, using *S. typhimurium* strains TA1535, TA1573, TA98, TA100, and TA102.[25] Dimethyl sulfoxide served as the vehicle. Propylheptyl caprylate was not mutagenic with or without metabolic activation.

An *in vitro* mammalian chromosomal aberration assay was performed in Chinese hamster V79 lung fibroblasts with 22.4-2480 µg/ml propylheptyl caprylate.[25] The exposure time was 4 h with metabolic activation and ranged from 4-28 h without metabolic activation. Propylheptyl caprylate was not clastogenic to Chinese hamster V79 lung fibroblasts.

Ethylhexyl Laurate

Ethylhexyl laurate, tested at doses 8, 40, 200, 1000, and 5000 µg/plate, was not mutagenic in an Ames test performed in *Salmonella typhimurium* with and without metabolic activation.[24]

Isodecyl Laurate

An Ames test was performed with 312-5000 µg/plate isodecyl laurate.[26] Isodecyl laurate was not mutagenic towards *S. typhimurium* strains TA97, TA98, TA100, and TA102. (No additional details were provided.)

In Vivo

Ethylhexyl Laurate

A mouse micronucleus test was performed in which male and female mice were dosed by gavage with 0, 1.25, 2.5, and 5.0 ml/kg ethylhexyl laurate.[24] The animals were killed after 4, 48, or 72 h. Ethylhexyl laurate was not genotoxic in this assay.

CARCINOGENICITY

Published carcinogenicity data were not found.

IRRITATION AND SENSITIZATION

Dermal Irritation

NON-HUMAN

Cetyl Esters

> *A formulation containing 60-65% cetyl esters was not irritating to rabbit skin upon application of 0.5 g under an occlusive patch for 24 h.*[1]
>
> *From the Final Report on the Safety Assessment of Cetyl Esters*[1]

Propylheptyl Caprylate

Groups of 3 female SPF albino rabbits were used to determine the irritation potential of propylheptyl caprylate.[25] The test material was applied as supplied for 4 h using a semi-occlusive patch; the amount applied was not specified. Two of the three rabbits had a mean score (calculated on the basis of the scores at 24, 48, and 72 h for each animal; max. value of 3) for erythema of 2, and one had a score of 2.33. For edema, the mean score for each animal was 0.33, 1, and 0. Dermal effects were observed at 7 days, but not 14 days, and propylheptyl caprylate was considered moderately irritating to rabbit skin.

Ethylhexyl Laurate

Using Organisation for Economic Co-operation and Development (OECD) Guideline 404 for "acute dermal irritation/corrosion" testing, ethylhexyl laurate was slightly irritating to rabbit skin.[24] The European Commission classification was not irritating.

Isopropyl Linoleate

> *In a primary skin irritation study using New Zealand albino rabbits, undiluted isopropyl linoleate and 10% aq. isopropyl linoleate were classified as a non-irritant and slight irritant, respectively. Both undiluted and 10% aq. isopropyl linoleate were slight irritants when he study was repeated with purer samples. In another primary skin irritation study, 10% isopropyl linoleate in corn oil did not product any irritation reactions in albino rabbits.*[2]
>
> *From the Final Report on the Safety Assessment of Isopropyl Linoleate*[2]

Isodecyl Laurate

The dermal irritation potential of 30% isodecyl laurate in liquid paraffin was determined.[26] Doses of 500 mg were applied to two 4 cm x 4 cm intact and abraded test sites, and the test material was not irritating. It is unclear as to what species was tested. Only summary information was provided; the species/strain test states rat/Wistar, however the result stat that the chemical was not irritating to the skin of rabbits. No other details were provided.

Cetyl Ethylhexanoate

The dermal irritation of cetyl ethylhexanoate was determined using rabbits, guinea pigs, rats, and miniature swine.[27] In rabbits, 0.1 g of undiluted cetyl ethylhexanoate was applied directly to a shaved 3 cm x 3 cm area on the back of six albino angora rabbits. n-Hexandecane was used as the control. A collar was used to prevent ingestion of the test substance. The test sites were scored for irritation 24 h after application. After scoring, the test site was clipped, the test article applied 30 min later, and the area was scored 48 h after application. Following this reading, all the hair on the dorsal surface was clipped and the animals were

injected with Evan's blue in physiological saline and then killed 1 h later. The total skin reaction score was assessed by evaluating erythema in live animals and the dilating rate, edema, and bluing rate in skin removed at the end of the study. The relative irritancy score for cetyl ethylhexanoate was 3/3, severely irritating to rabbit skin.

A similar protocol and scoring was followed using groups of six male Hartley guinea pigs and six male Wistar rats, with the exception that the control was an untreated site. Again, the dose tested was 0.1 g cetyl ethylhexanoate applied to a 3 cm x 3 cm area of shaved skin. The relative irritancy score for cetyl ethylhexanoate was 2/3, moderately irritating, in the guinea pig and 1/3, mildly irritating, in the rat.

Using miniature swine, 0.05 g cetyl ethylhexanoate was applied to the clipped skin of 6 animals for 48 h using a 15 mm occlusive patch. The test site was then scored as described above. The relative irritancy score for cetyl ethylhexanoate was 0/3 in miniature swine, non-irritating.

HUMAN

Propylheptyl Caprylate

The dermal irritation of 10, 25, or 50% propylheptyl caprylate in mineral oil and 100% propylheptyl caprylate was evaluated in 22 subjects.[25] Approximately 0.2 ml of each test material was applied using a 1.9 cm x 1.9 cm occlusive patch, delivering a does of 47.6 mg/cm^2 undiluted propylheptyl caprylate, for 48 h. No dermal effects were noted at any test concentration, and propylheptyl caprylate was non-irritating following a single 48-h occlusive application.

Ethylhexyl Laurate

An open epicutaneous test was performed in 10 subjects to determine the irritation potential of 50% and undiluted 2-ethylhexyl esters of C8-14 fatty acids.[24] The test substance was applied for 60 min, and was not irritating at either concentration. (Additional details were not provided.)

In closed epicutaneous test using 20 subjects, 25, 50,and 100% 2-ethylhexyl esters of C8-14 fatty acids was applied for 24 h using an occlusive patch.[24] No reactions were observed at concentrations of 25 or 50%. However, with undiluted test article, slight erythema, 3 incidences of moderate edema, and 1 of slight edema were observed. (Additional details were not provided.)

Cetyl Ethylhexanoate

The dermal irritation of cetyl ethylhexanoate was evaluated by applying 0.05 g of undiluted test article on a 15 mm patch to 50 male subjects.[27] The patches were removed after 48 h, and the test sites scored 30 min later. Undiluted cetyl ethylhexanoate was mildly irritating (defined as producing 10-40% positive reactions) to humans skin. (Additional details were not provided.)

Sensitization

NON-HUMAN

Propylheptyl Caprylate

The sensitization potential of 0, 2, 10, and 50% propylheptyl caprylate in corn oil was evaluated in a mouse local lymph node assay.[25] A lymphocyte proliferative response was not induced, indicating that propylheptyl caprylate is not a sensitizer.

Ethylhexyl Laurate

A guinea pig maximization test was performed to determine the sensitization potential of ethylhexyl laurate.[24] The concentrations used for intradermal and topical induction were 0.5 and 40%, respectively, and the challenge concentration was 20%. Ethylhexyl laurate was not a sensitizer. (Additional details were not provided.)

Isodecyl Laurate

A GPMT conducted to determine the sensitization potential of isodecyl laurate.[26] It was reported that isodecyl laurate was not a sensitizer in guinea pigs, but no details of the study were provided.

HUMAN

Butyl Oleate

The sensitization potential of butyl oleate was determined in a maximization study in 9 male and 16 female subjects.[28] An occlusive patch was applied to the volar forearm of all subjects for 5 alternate-day 48-h periods. Because a preliminary 48-hour occlusive patch did not cause irritation, an occlusive patch of 5% aq. sodium lauryl sulfate was applied prior to patching with butyl oleate. The challenge sites were scored upon patch removal and 24 h later. All challenge scores were 0, and butyl oleate was not a sensitizer. (Additional details were not provided.)

Ocular Irritation

Cetyl Esters

A formulation containing 60-65% cetyl esters was not an irritant to rabbit eyes in a Draize study.[1]
From the Final Report on the Safety Assessment of Cetyl Esters[1]

Propylheptyl Caprylate

The ocular irritation potential of propylheptyl caprylate was evaluated in 3 female rabbits.[25] Slight conjunctival irritation was observed in all animals 1 h after instillation, and the irritation had increased to a more diffuse response in one animal at 24 h after instillation. All effects subsided within 72 h for two of the animals and by 7 days in the third animal. Propylheptyl caprylate was considered slightly irritating to rabbit eyes.

Ethylhexyl Laurate

Ethylhexyl laurate was not irritating to rabbit eyes.[24] (Details not provided.)

Isopropyl Linoleate

In Draize studies using rabbits, undiluted and 10% aq. isopropyl linoleate were slight ocular irritants, while 10% in corn oil was not irritating.[2]
From the Final Report on the Safety Assessment of Isopropyl Linoleate[2]

Isodecyl Laurate

A study was conducted in New Zealand White rabbits to determine the ocular irritation potential of 10% isodecyl laurate in liquid paraffin.[26] No significant treatment-related ocular lesions were observed. (No additional details were provided.)

MISCELLANEOUS EFFECTS

Dermal Effects

Isostearyl Isostearate

A determination of skin surface water loss, measured using a plastic occlusion stress test, indicated that isostearyl isostearate improved the stratum corneum water permeability barrier function.[29] The researchers hypothesize that the improvement was due to effects on stratum corneum lipid phase behavior.

SUMMARY

Cetyl esters has been reviewed previously by the Cosmetic Ingredient Review (CIR) Expert Panel, and in 1997 the Panel concluded that cetyl esters was safe as used in cosmetics. Cetyl esters is a member of a broader group of cosmetic ingredients, the alkyl esters. These ingredients consist of the reaction products of fatty acids and alcohols, and the core relationship between these ingredients is a carboxyl ester functional group flanked on both sides by alkyl chains. Some of these alkyl chains are straight and some are branched. Some of the alkyl esters have been reviewed previously by the CIR. Those that have not been reviewed are being included as ingredients in this re-review due to their structural and functional similarity. (Isopropyl linoleate is an exception; this ingredient has been reviewed previously but is due to be re-reviewed.) All of the ingredients included in the safety assessment, with the exception of isopropyl sorbate, are reported to function in cosmetics as skin conditioning agents; isopropyl sorbate is reported to function as a preservative.

Most of these alkyl esters are produced synthetically via classical Fischer type esterification methods. However, some of the natural source ingredients in this review may be produced by transesterification. Alkyl esters are hydrophobic materials that range from oils at the lowest molecular weights/shortest chain lengths to waxy solids at the highest molecular weights/longest chain lengths.

VCRP data indicate that 66 of the 205 alkyl esters named in this safety assessment are currently used in cosmetic formulations. Cetyl esters has the most uses and is reported to be used in 451 cosmetic formulations; 235 of those formulations are leave-ons. Cetyl ethylhexanoate and ethylhexyl hydroxystearate are reported to be in 294 and 229 formulations, respectively. Isoamyl laurate is approved as a direct food additive and isobutyl palmitate, isobutyl tallate, isopropyl laurate, and isopropyl oleate are approved indirect food additives.

In rats fed a diet containing 20% cetyl oleate, absorption of cetyl oleate was reported to be 75.3%. All the animals developed seborrhea. The absorbability and seborrhea suggested that cetyl oleate was not hydrolyzed in the gut. Alkyl esters tended to increase the permeation rate of indomethacin and ketoprofen; the increase occurred due to increased solubility. Isostearyl isostearate increased the rate of penetration of fluorouracil through excised skin, but it was not a penetration enhancer.

The dermal LD_{50} of butyl oleate in rabbits was >5 g/kg, and the dermal LD_{50} in rats of propylheptyl caprylate and ethylhexyl laurate and was >2 and >3 g/kg/bw, respectively. The oral LD_{50} of cetyl esters was >20 g/kg in mice, and the oral LD_{50} in rats was >5 g/kg for butyl oleate, >2 g/kg for propylheptyl caprylateand ethylhexyl laurate, >13 g/kg for isodecyl oleate, and >64 cc/kg for isopropyl linoleate. The inhalation LC_{50} of ethylhexyl laurate in rats was >230 ppm. In repeated dose studies in rats, toxic effects were not observed with oral administration of up to 1000 mg/kg ethylhexyl laurate or 4500 mg/kg/day isodecyl laurate for 4 wks or with up to 1000 mg/kg bw/day propylheptyl caprylate for 90 days.

Propylheptyl caprylate was not mutagenic in an Ames assay (≤5.0 µl/plate) or clastogenic in an *in vitro* mammalian chromosomal aberration assay (≤2480 µg/ml). Ethylhexyl laurate and isodecyl laurate were not mutagenic towards *S. typhimurium* in an Ames assay at doses of ≤5000 µg/plate, and ethylhexyl laurate, ≤5.0 ml/kg, was not genotoxic in a mouse micronucleus test.

Mixed results were reported in irritation testing in rabbits with some alkyl esters. Propylheptyl caprylate was moderately irritating to rabbit skin, ethylhexyl laurate was not irritating to rabbit skin, and 10% and undiluted isopropyl linoleate were at most slightly irritating to rabbit skin. In non-human studies, undiluted cetyl ethylhexanoate was severely irritating to rabbit skin, moderately irritating to guinea pig skin, mildly irritating to rat skin, and non-irritating to the skin of miniature swine. In a mouse local lymph node assay, propylheptyl caprylate did induce a lymphocyte proliferative response, indicating that it is not a sensitizer. Ethylhexyl laurate and isodecyl laurate were not sensitizers in a guinea pig maximization test.

Mixed irritation results were also observed in human studies. Propylheptyl caprylate, which was moderately irritating in rabbit skin, was not irritating to human skin when applied for 48-h using an occlusive patch. Undiluted and 50% 2-ethylhexyl esters of C8-14 fatty acids applied openly for 60 min and 25 and 50% applied with an occlusive 24-h patch were not irritating, but undiluted 2-ethylheyxl esters of C8-14 fatty acids produced slight erythema and moderate edema when applied with an occlusive 24-h patch. A 48-h patch with undiluted cetyl ethylhexanoate produced mild irritation. Butyl oleate was not a sensitizer in humans.

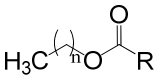
Ocular irritation studies were performed using rabbits. Cetyl esters, 60-65%, ethylhexyl laurate, 10% isodecyl laurate in liquid paraffin, and 10% isopropyl laurate in corn oil were not irritating to rabbit eyes and undiluted and 10% aq. isopropyl linoleate and propylheptyl caprylate was slightly irritating to rabbit eyes.

FIGURES

Figure 1. Figures ordered by chain length, chemical structure

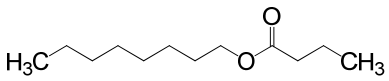
Structures, straight chain alkyl ingredients by total length

1. Cetyl Esters

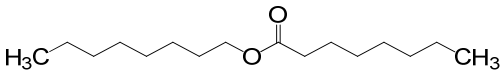


wherein R is an alkyl chain 13 to 17 carbons long and n is 13 to 17

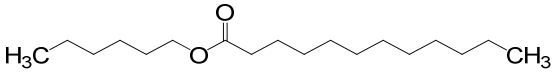
2. Caprylyl Butyrate



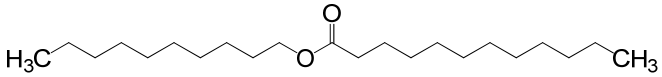
3. Caprylyl Caprylate



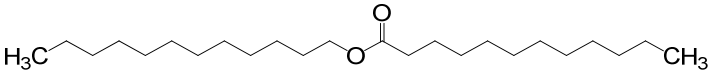
4. Hexyl Laurate



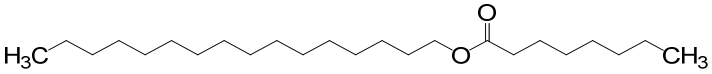
5. Decyl Laurate



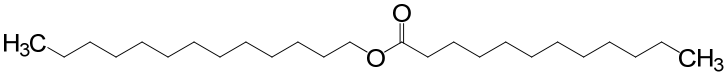
6. Lauryl Laurate



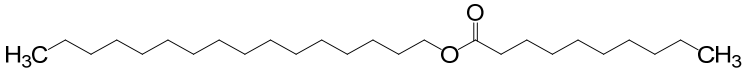
7. Cetyl Caprylate



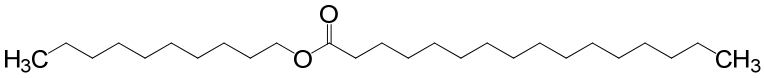
8. Tridecyl Laurate



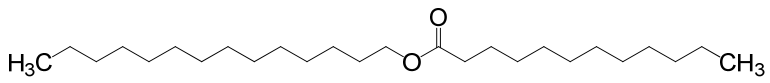
9. Cetyl Caprate



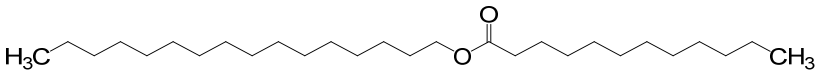
10. Decyl Palmitate



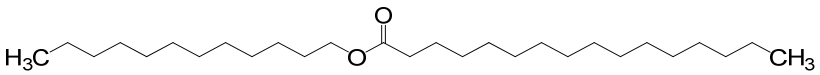
11. **Myristyl Laurate**



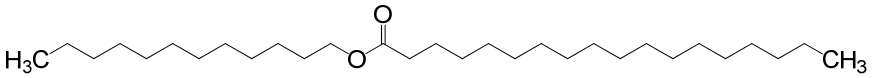
12. **Cetyl Laurate**



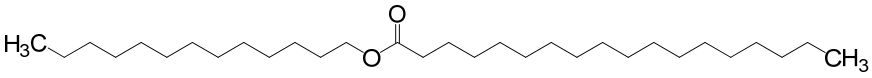
13. **Lauryl Palmitate**



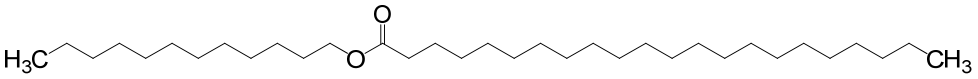
14. **Lauryl Stearate**



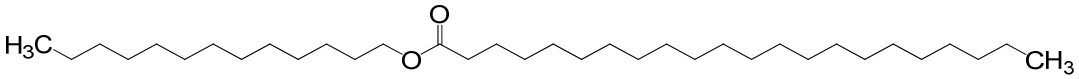
15. **Tridecyl Stearate**



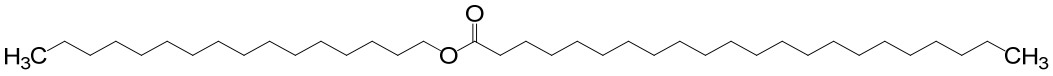
16. **Lauryl Behenate**



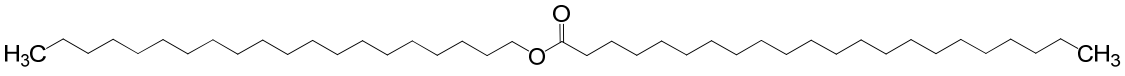
17. **Tridecyl Behenate**



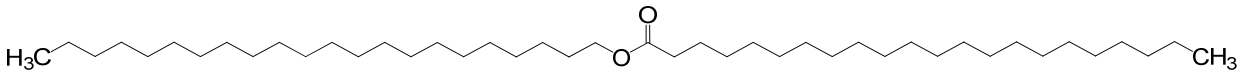
18. **Cetyl Behenate**



19. **Arachidyl Behenate**

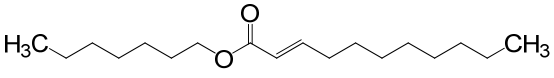


20. **Behenyl Behenate**

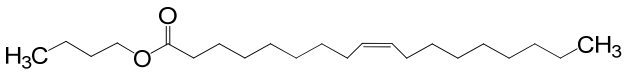


Unsaturated

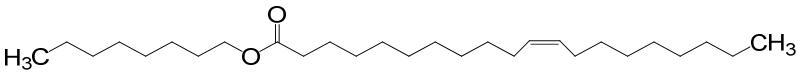
21. **Heptyl Undecylenate**



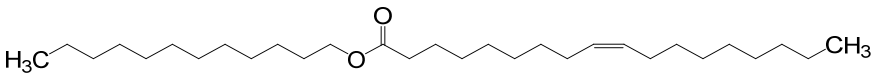
22. **Butyl Oleate**



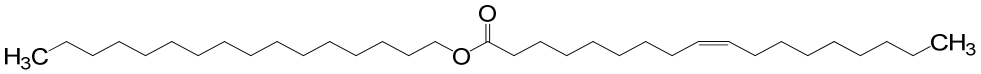
23. **Caprylyl Eicosenoate**



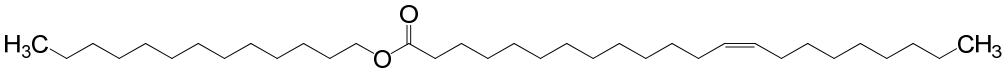
24. **Lauryl Oleate**



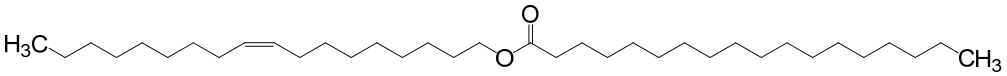
25. **Cetyl Oleate**



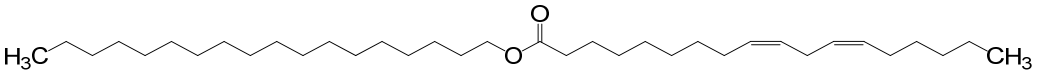
26. **Tridecyl Erucate**



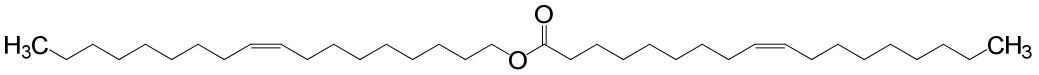
27. **Oleyl Stearate**



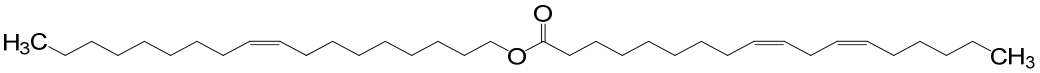
28. **Stearyl Linoleate**



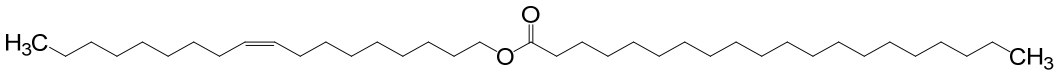
29. **Oleyl Oleate**



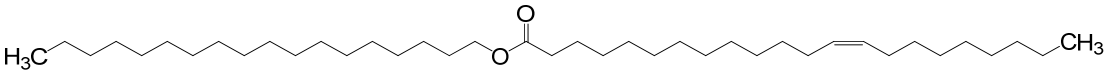
30. **Oleyl Linoleate**



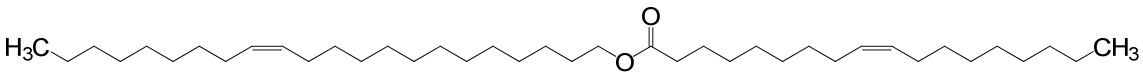
31. **Oleyl Arachidate**



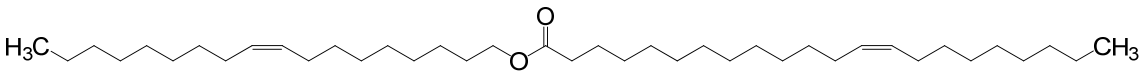
32. **Stearyl Erucate**



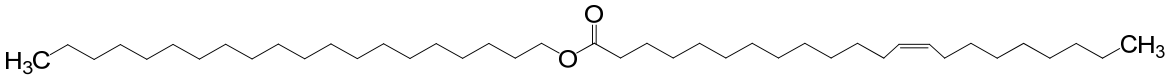
33. **Erucyl Oleate**



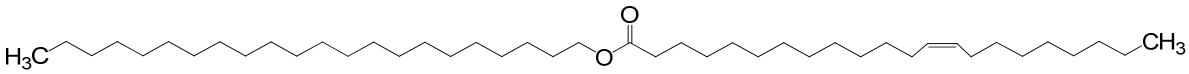
34. **Oleyl Erucate**



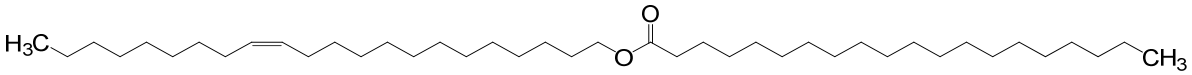
35. **Arachidyl Erucate**



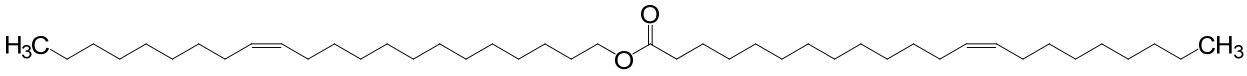
36. **Behenyl Erucate**



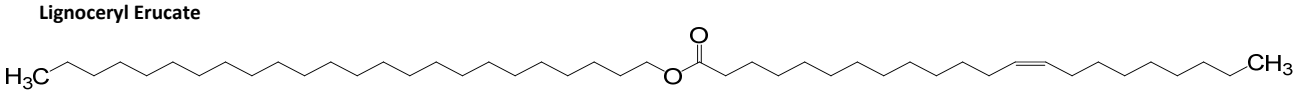
37. **Erucyl Arachidate**



38. **Erucyl Erucate**

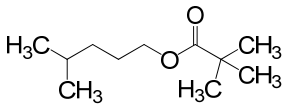


39. **Lignoceryl Erucate**

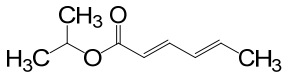


Branched

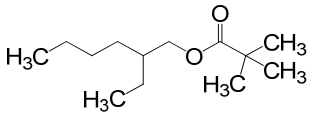
40. **Isohexyl Neopentanoate (one example of an "iso")**



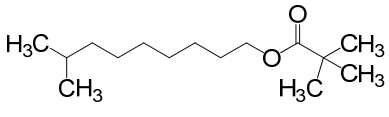
41. **Isopropyl Sorbate**



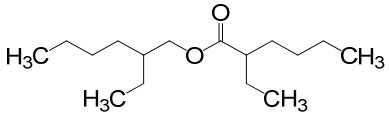
42. **Ethylhexyl Neopentanoate**



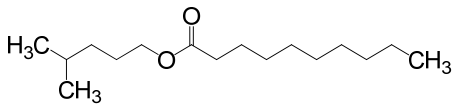
43. **Isodecyl Neopentanoate (one example of an "iso")**



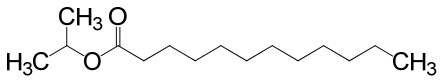
44. **Ethylhexyl Ethylhexanoate**



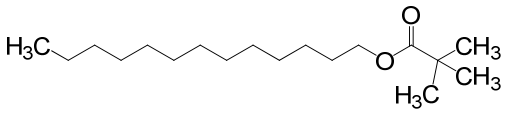
45. Isohexyl Caprate (one example of an "iso")



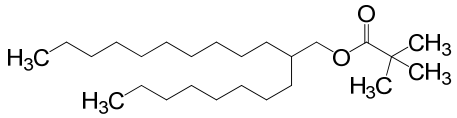
46. Isopropyl Laurate



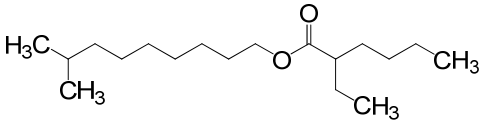
47. Tridecyl Neopentanoate



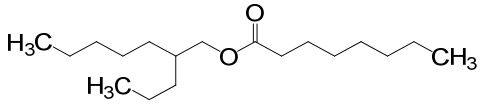
48. Octyldodecyl Neopentanoate



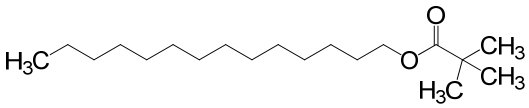
49. Isodecyl Ethylhexanoate (one example of an "iso")



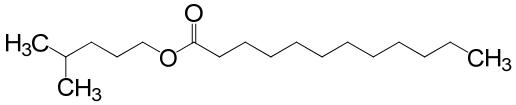
50. Propylheptyl Caprylate



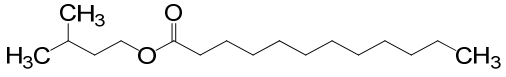
51. Myristyl Neopentanoate



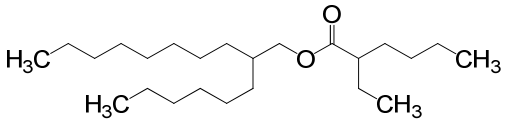
52. Isohexyl Laurate (one example of an "iso")



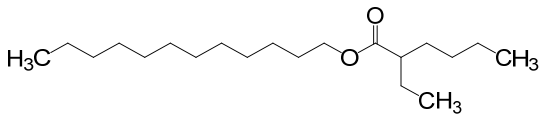
53. Isoamyl Laurate



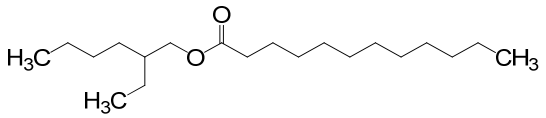
54. Hexyldecyl Ethylhexanoate



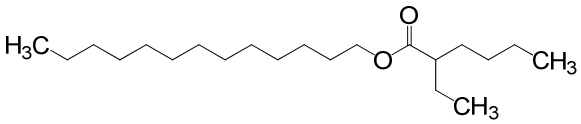
55. **Lauryl Ethylhexanoate**



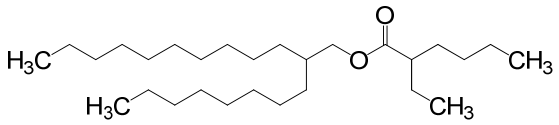
56. **Ethylhexyl Laurate**



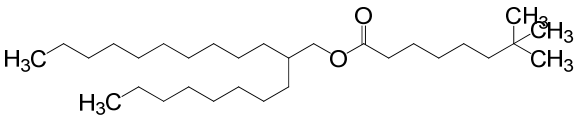
57. **Tridecyl Ethylhexanoate**



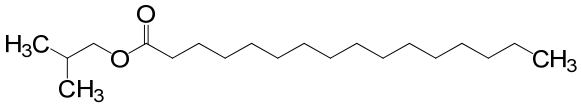
58. **Octyldodecyl Ethylhexanoate**



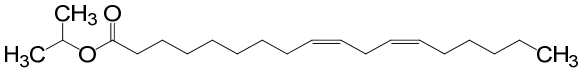
59. **Octyldodecyl Neodecanoate**



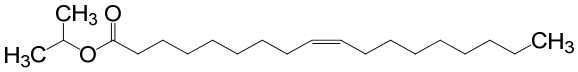
60. **Isobutyl Palmitate**



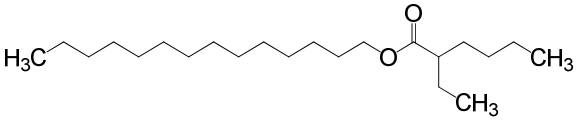
61. **Isopropyl Linoleate**



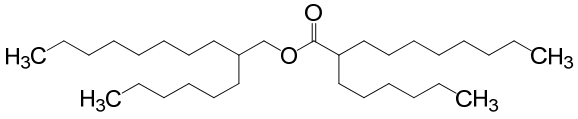
62. **Isopropyl Oleate**



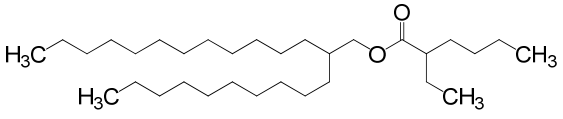
63. **Myristyl Ethylhexanoate**



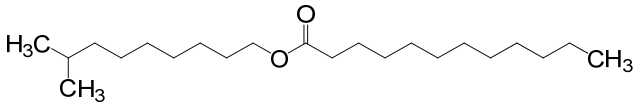
64. **Hexyldecyl Hexyldecanoate**



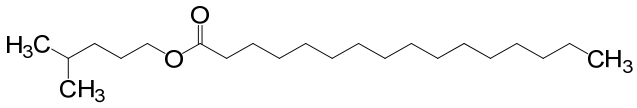
65. **Decyltetradecyl Ethylhexanoate**



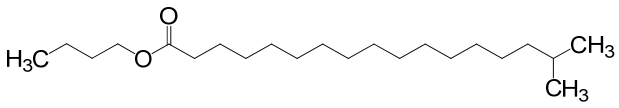
66. Isodecyl Laurate (one example of an "iso")



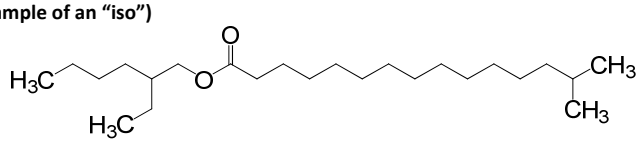
67. Isohexyl Palmitate (one example of an "iso")



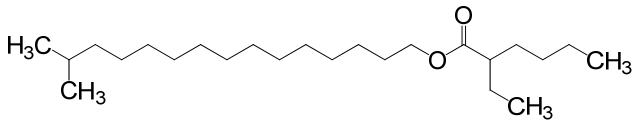
68. Butyl Isostearate (one example of an "iso")



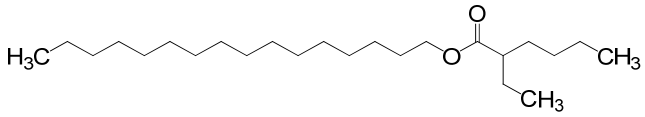
69. Ethylhexyl Isopalmitate (one example of an "iso")



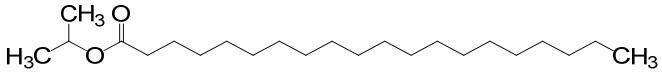
70. Isocetyl Ethylhexanoate (one example of an "iso")



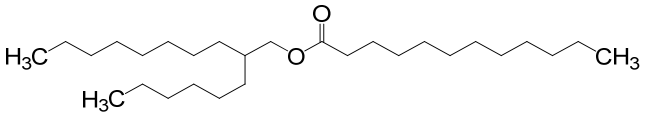
71. Cetyl Ethylhexanoate



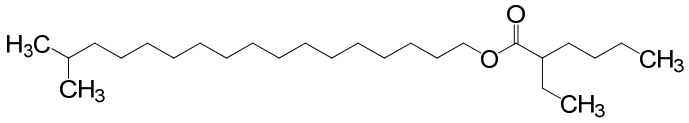
72. Isopropyl Arachidate (one example of an "iso")



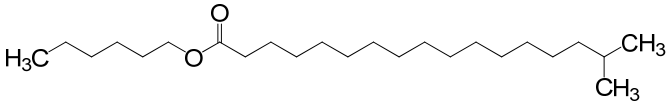
73. Hexyldecyl Laurate



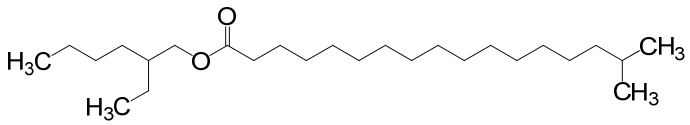
74. Isostearyl Ethylhexanoate (one example of an "iso")



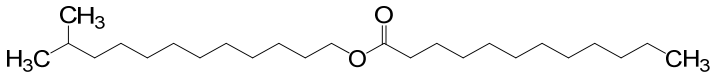
75. Hexyl Isostearate (one example of an "iso")



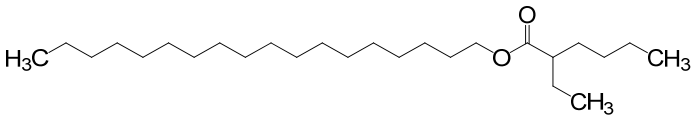
76. Ethylhexyl Isostearate (one example of an "iso")



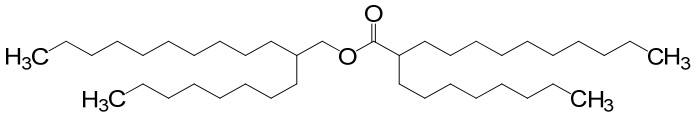
77. Isotridecyl Laurate (one example of an "iso")



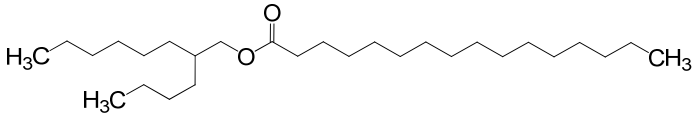
78. Stearyl Ethylhexanoate



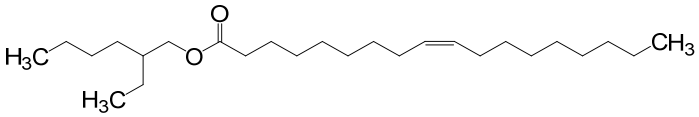
79. Octyldodecyl Octyldodecanoate



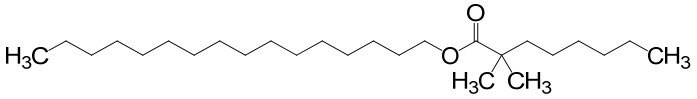
80. Butyloctyl Palmitate



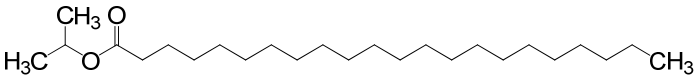
81. Ethylhexyl Oleate



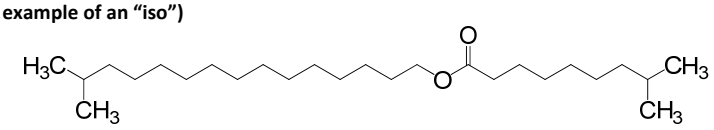
82. Cetyl Dimethyloctanoate



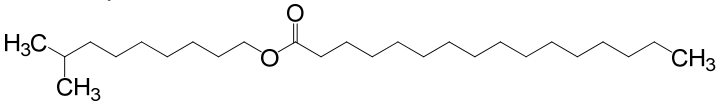
83. Isopropyl Behenate (one example of an "iso")



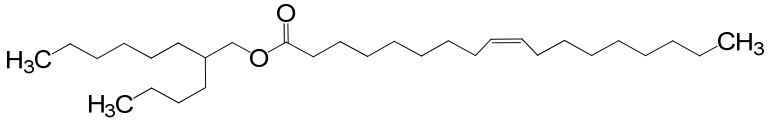
84. Isocetyl Isodecanoate (one example of an "iso")



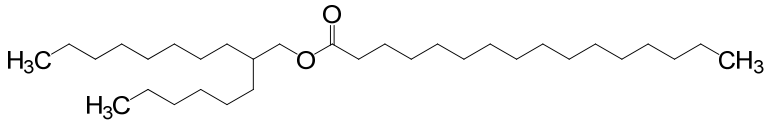
85. Isodecyl Palmitate (one example of an "iso")



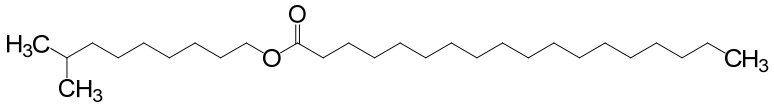
86. Butyloctyl Oleate



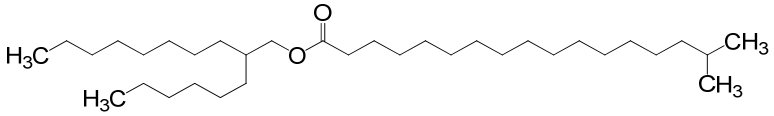
87. **Hexyldecyl Palmitate**



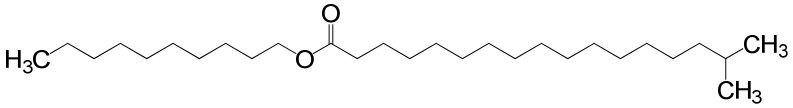
88. **Isodecyl Stearate (one example of an "iso")**



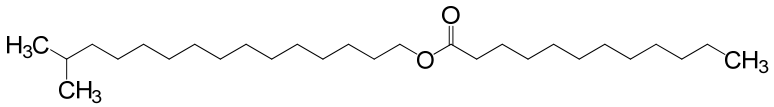
89. **Hexyldecyl Isostearate (one example of an "iso")**



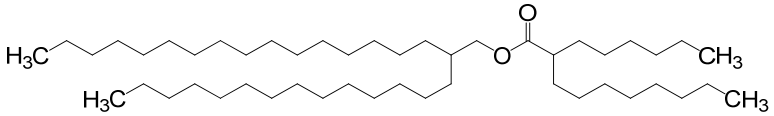
90. **Decyl Isostearate (one example of an "iso")**



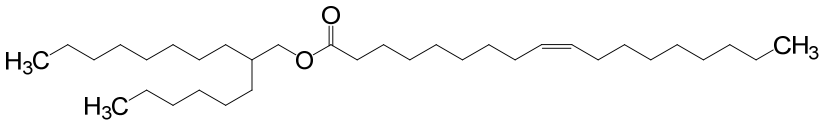
91. **Isocetyl Laurate (one example of an "iso")**



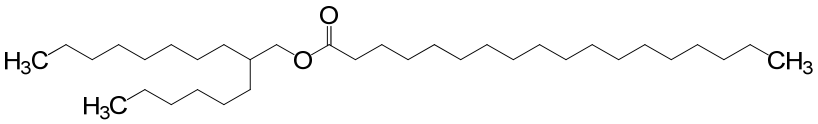
92. **Tetradecyloctadecyl Hexyldecanoate**



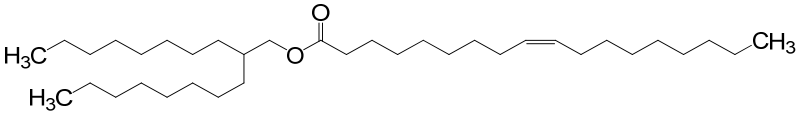
93. **Hexyldecyl Oleate**



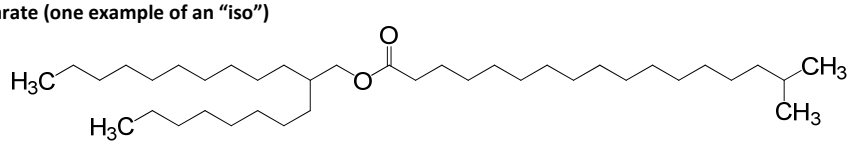
94. **Hexyldecyl Stearate**



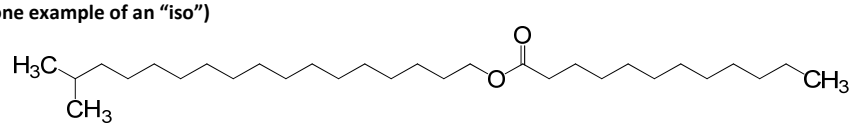
95. **Octyldecyl Oleate**



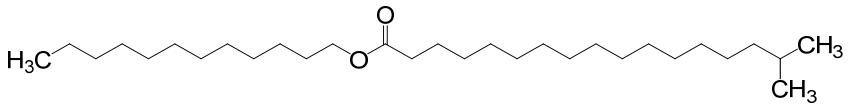
96. **Octyldodecyl Isostearate (one example of an "iso")**



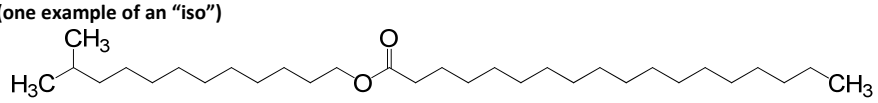
97. **Isostearyl Laurate (one example of an "iso")**



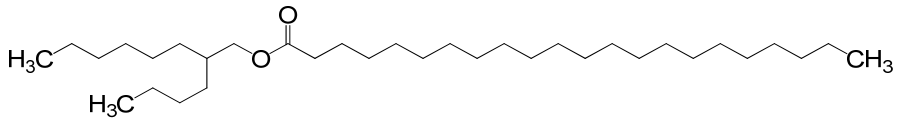
98. **Lauryl Isostearate (one example of an "iso")**



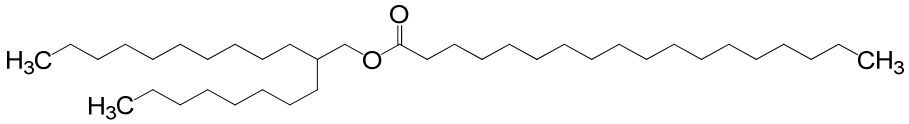
99. **Isotridecyl Stearate (one example of an "iso")**



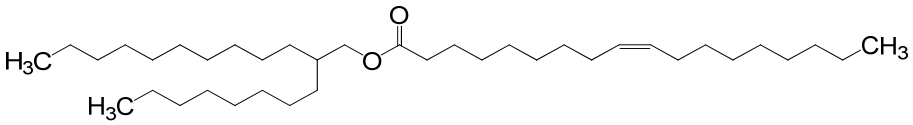
100. **Butyloctyl Behenate**



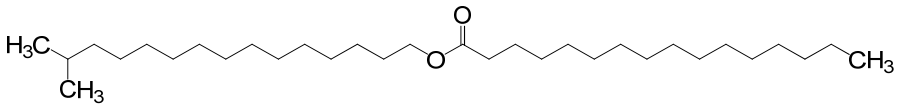
101. **Octyldodecyl Stearate**



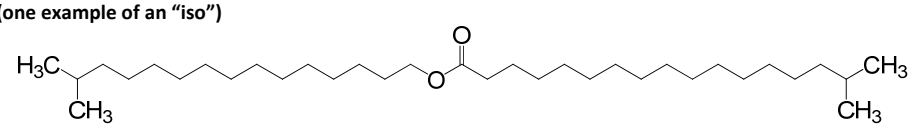
102. **Octyldodecyl Oleate**



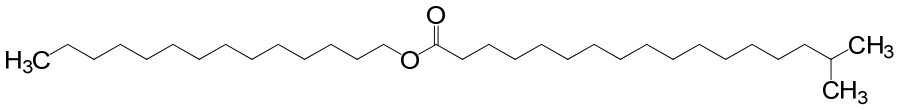
103. **Isocetyl Palmitate (one example of an "iso")**



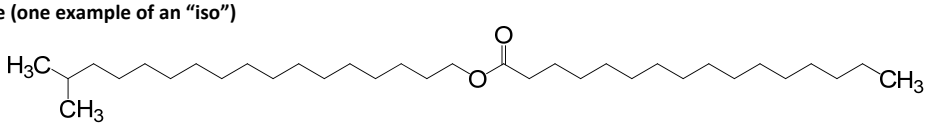
104. **Isocetyl Isostearate (one example of an "iso")**



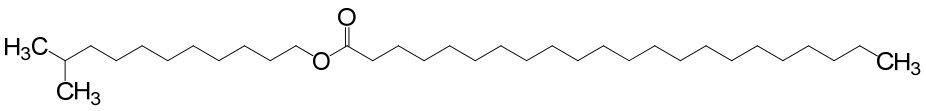
105. **Myristyl Isostearate (one example of an "iso")**



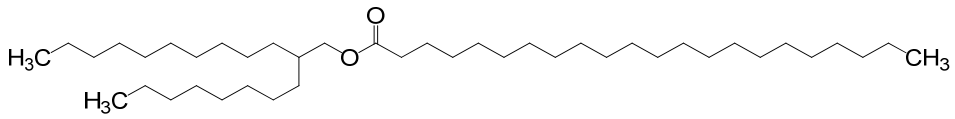
106. **Isostearyl Palmitate (one example of an "iso")**



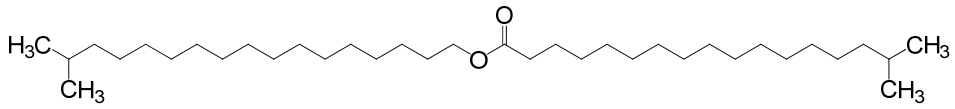
107. **Isolauryl Behenate (one example of an "iso")**



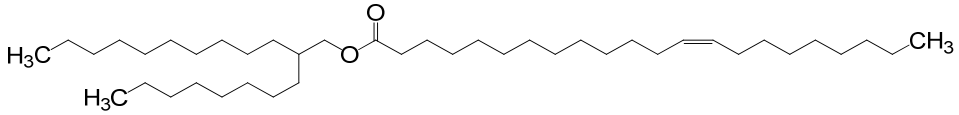
108. Octyldodecyl Behenate



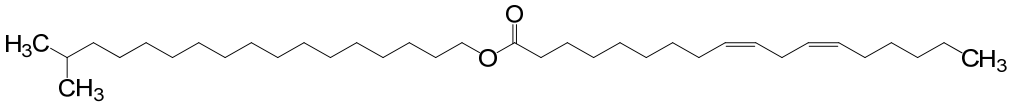
109. Isostearyl Isostearate (one example of an "iso")



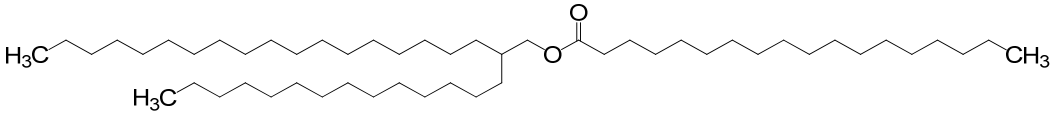
110. Octyldodecyl Erucate



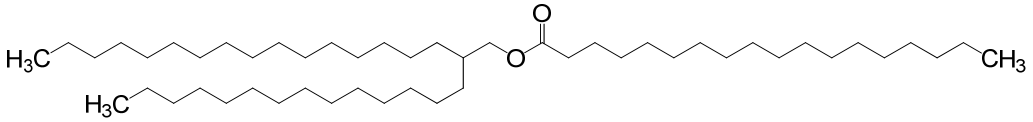
111. Isostearyl Linoleate (one example of an "iso")



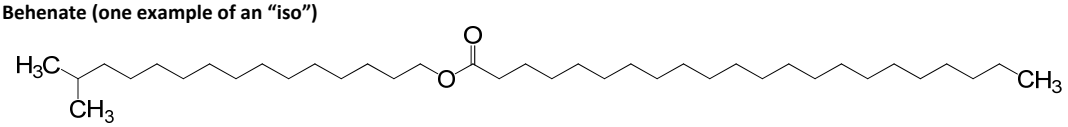
112. Tetradecyleicosyl Stearate



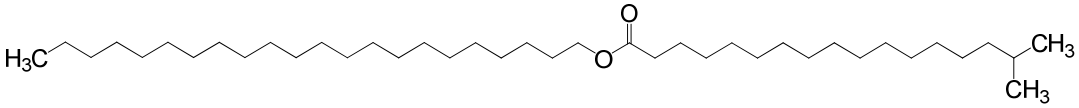
113. Tetradecyloctadecyl Stearate



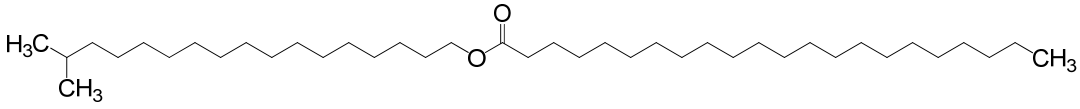
114. Isocetyl Behenate (one example of an "iso")



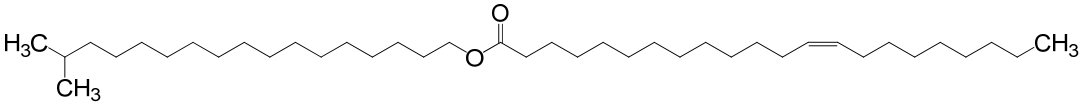
115. Behenyl Isostearate (one example of an "iso")



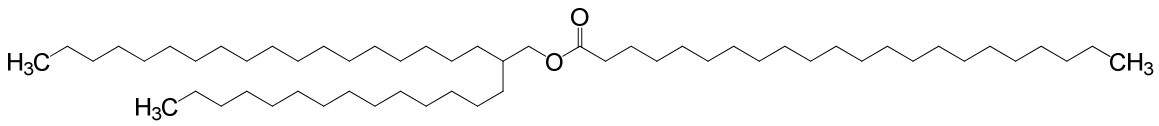
116. Isostearyl Behenate (one example of an "iso")



117. Isostearyl Erucate (one example of an "iso")

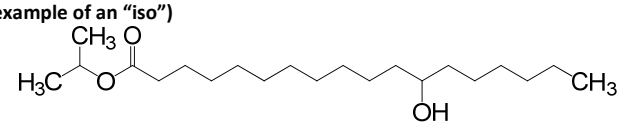


118. Tetradecyloctadecyl Behenate

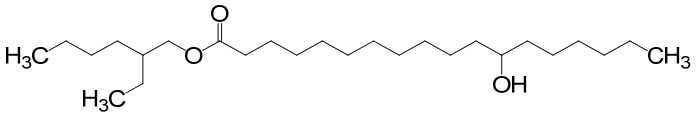


Hydroxy-substituted

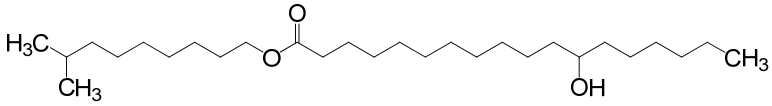
119. Isopropyl Hydroxystearate (one example of an "iso")



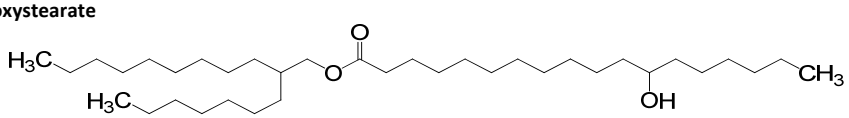
120. Ethylhexyl Hydroxystearate



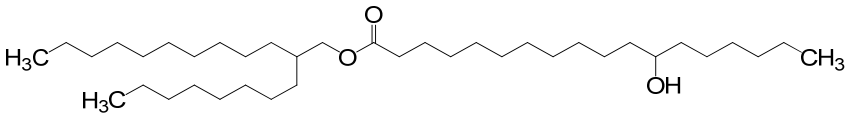
121. Isodecyl Hydroxystearate (one example of an "iso")



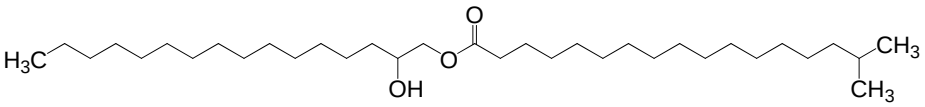
122. Heptylundecyl Hydroxystearate



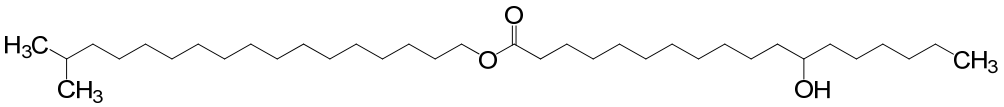
123. Octyldodecyl Hydroxystearate



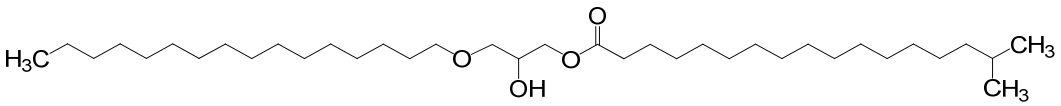
124. Hydroxycetyl Isostearate (one example of an "iso")



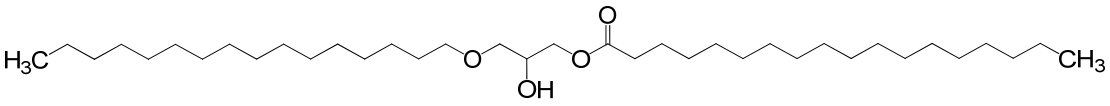
125. Isostearyl Hydroxystearate (one example of an "iso")



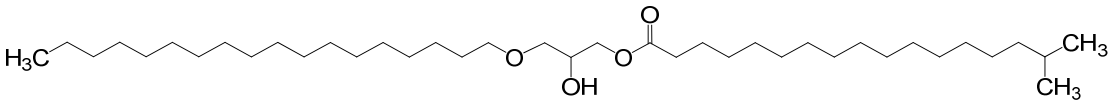
126. Chimyl Isostearate (one example of an "iso")



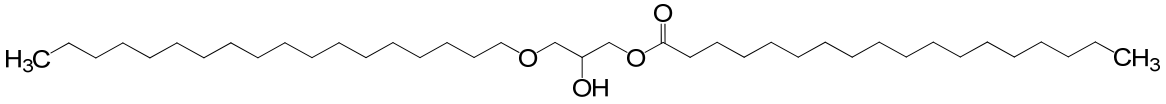
127. Chimyl Stearate



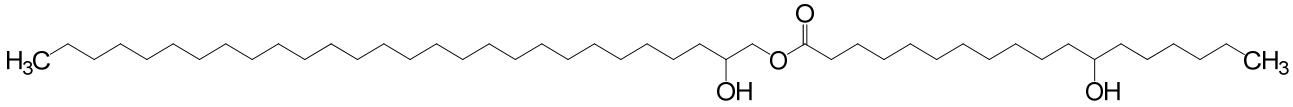
128. Batyl Isostearate (one example of an "iso")



129. Batyl Stearate

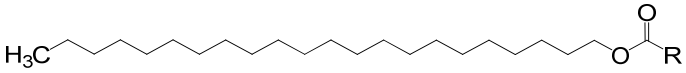


130. Hydroxyoctacosanyl Hydroxystearate

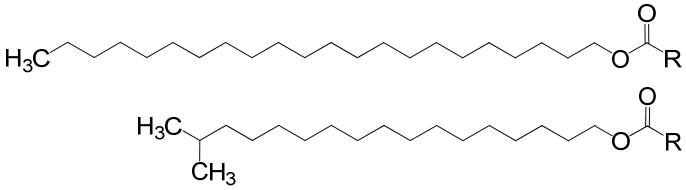


Mixtures (alphabetical)

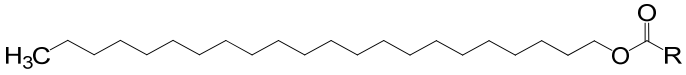
131. Behenyl Beeswax


wherein R is an alkyl chain 23 to 35 carbons long

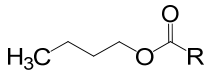
132. Behenyl/Isostearyl Beeswax (one example of an "iso")


wherein R is an alkyl chain 23 to 35 carbons long

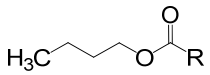
133. Behenyl Olivate


wherein represents the fatty acids derived from olive oil

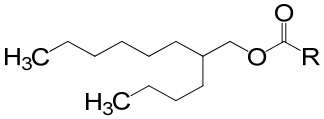
134. Butyl Avocadate


wherein represents the fatty acids derived from avocado oil

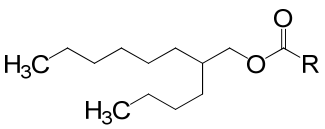
135. Butyl Babassuate


wherein represents the fatty acids derived from babassu oil

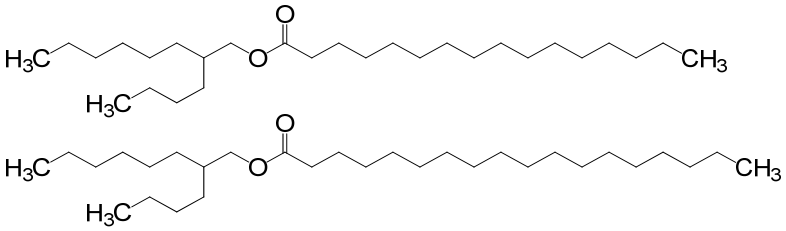
136. Butyloctyl Beeswax


wherein R is an alkyl chain 23 to 35 carbons long

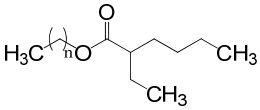
137. Butyloctyl Candelillate


wherein represents the fatty acids derived from candelilla oil

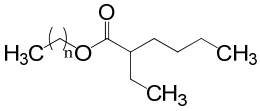
138. Butyloctyl Cetearate



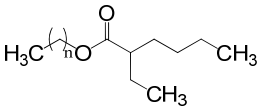
139. C12-13 Alkyl Ethylhexanoate



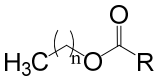
140. C12-15 Alkyl Ethylhexanoate



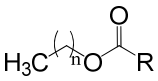
141. C14-18 Alkyl Ethylhexanoate



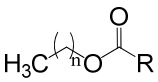
142. C14-30 Alkyl Beeswax



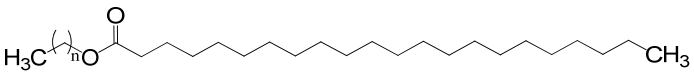
143. C18-38 Alkyl Beeswax



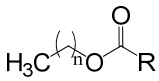
144. C30-50 Alkyl Beeswax



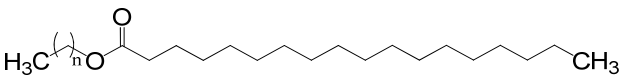
145. C20-40 Alkyl Behenate



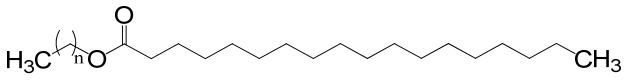
146. C18-38 Alkyl C24-54 Acid Ester



147. C16-36 Alkyl Stearate

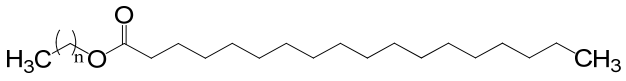


148. C20-40 Alkyl Stearate



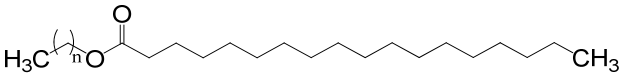
wherein n is 19 to 39

149. C30-50 Alkyl Stearate



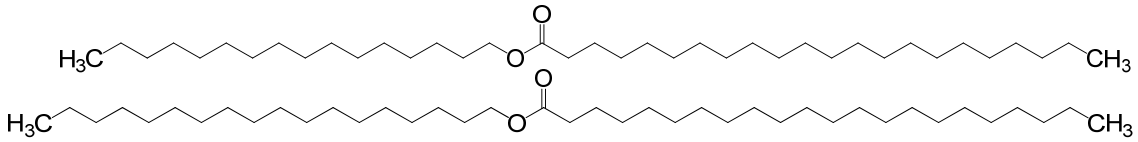
wherein n is 29 to 49

150. C40-60 Alkyl Stearate

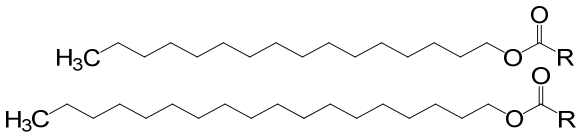


wherein n is 39 to 59

151. Cetearyl Behenate

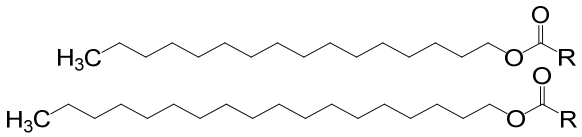


152. Cetearyl Candelillate



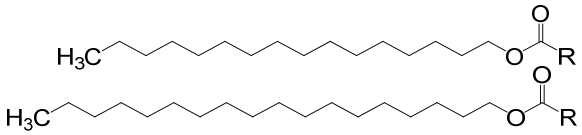
wherein represents the fatty acids derived from candelilla oil

153. Cetearyl Olivate



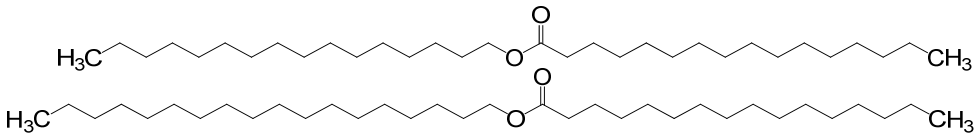
wherein represents the fatty acids derived from olive oil

154. Cetearyl Palmate

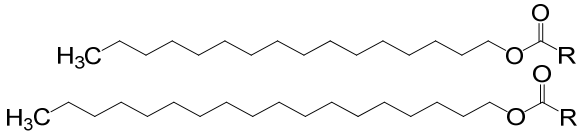


wherein represents the fatty acids derived from Palm Acid

155. Cetearyl Palmitate

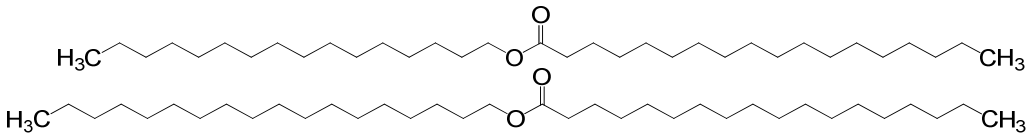


156. Cetearyl Rice Branate

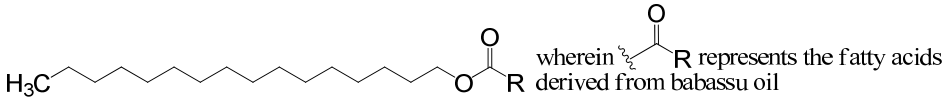


wherein represents the fatty acids derived from Rice Bran Acid

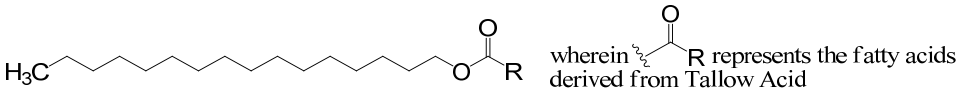
157. Cetearyl Stearate



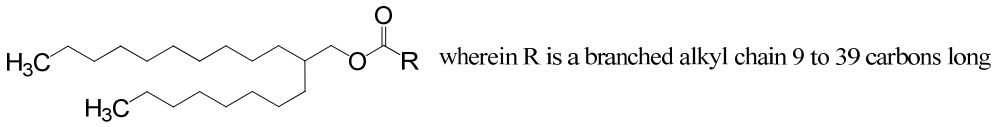
158. Cetyl Babassuate



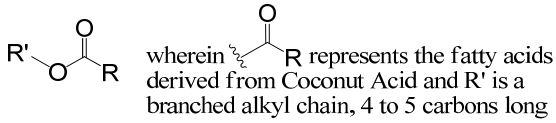
159. Cetyl Tallowate



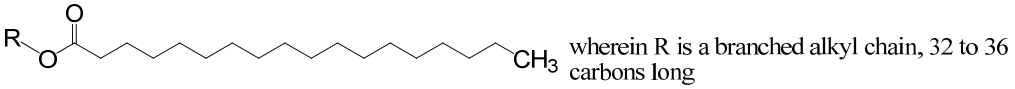
160. C10-40 Isoalkyl Acid Octyldodecanol Esters



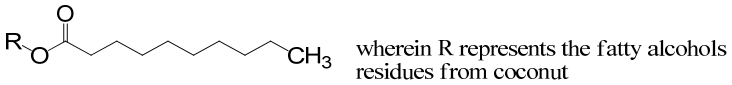
161. C4-5 Isoalkyl Cocoate



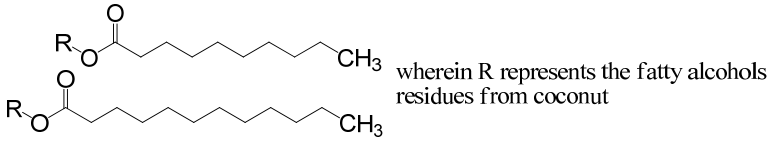
162. C32-36 Isoalkyl Stearate



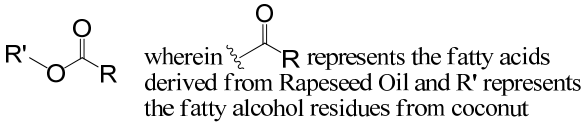
163. Coco-Caprylate



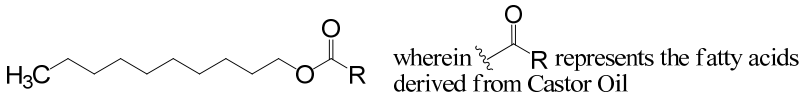
164. Coco-Caprylate/Caprate



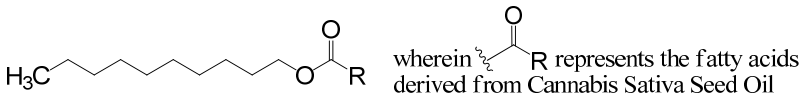
165. Coco-Rapeseedate



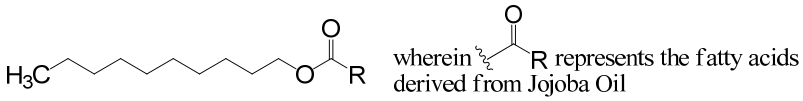
166. Decyl Castorate



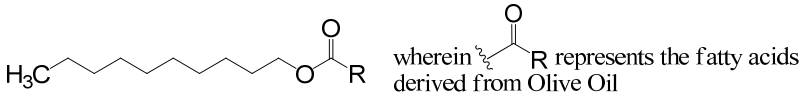
167. Decyl Hempseedate



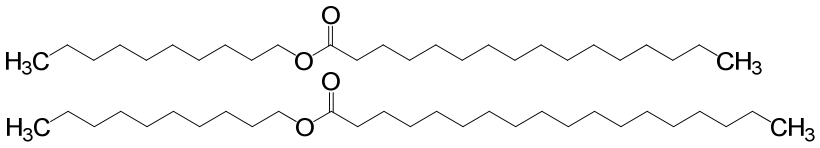
168. Decyl Jojobate



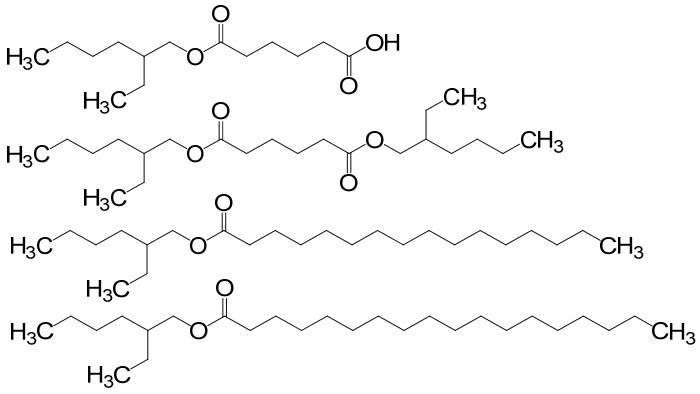
169. Decyl Olivate



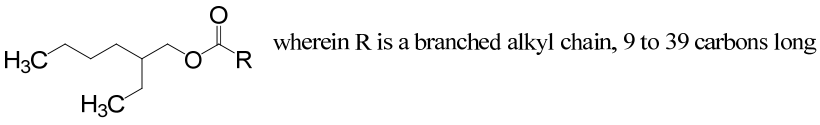
170. Decyltetradecyl Cetearate



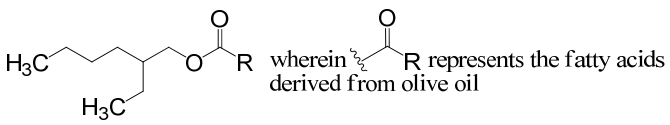
171. Ethylhexyl Adipate/Palmitate/Stearate



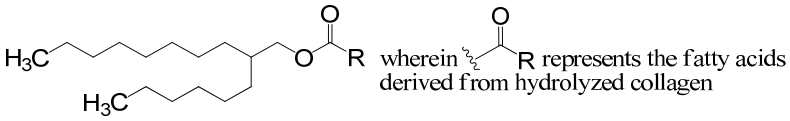
172. Ethylhexyl C10-40 Isoalkyl Acidate



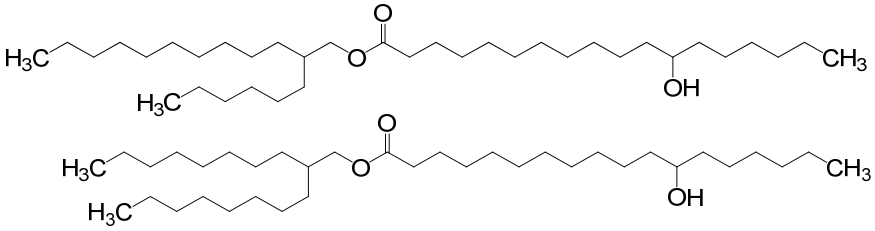
173. Ethylhexyl Olivate



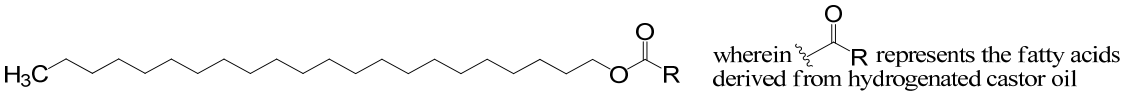
174. Hexyldecyl Ester of Hydrolyzed Collagen



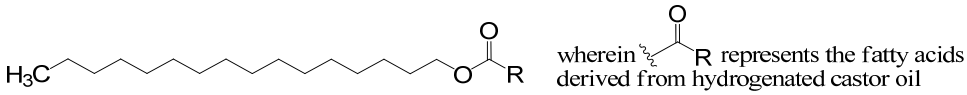
175. Hexyldodecyl/Octyldecyl Hydroxystearate



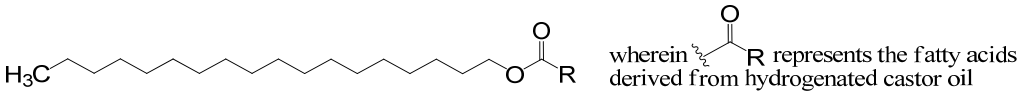
176. Hydrogenated Castor Oil Behenyl Esters



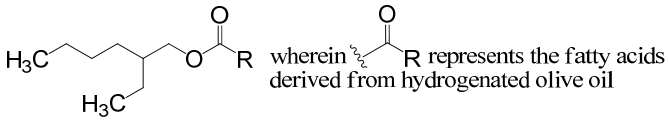
177. Hydrogenated Castor Oil Cetyl Esters



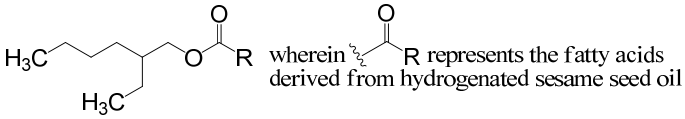
178. Hydrogenated Castor Oil Stearyl Esters



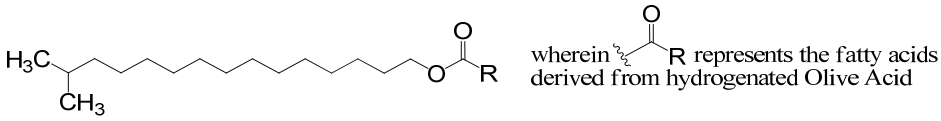
179. Hydrogenated Ethylhexyl Olivate



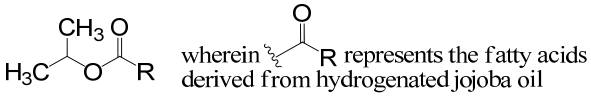
180. Hydrogenated Ethylhexyl Sesamate



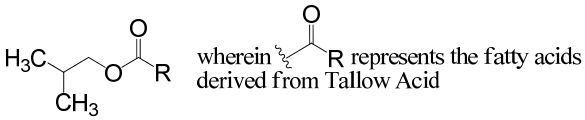
181. Hydrogenated Isocetyl Olivate (one example of an "iso")



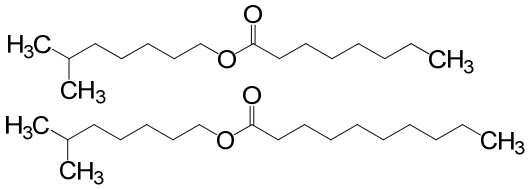
182. Hydrogenated Isopropyl Jojobate



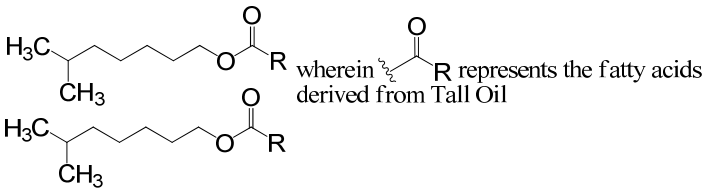
183. Isobutyl Tallowate



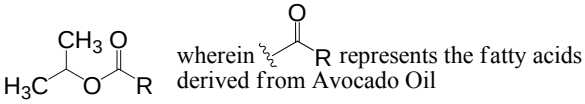
184. Isooctyl Caprylate/Caprate (one example of an "iso")



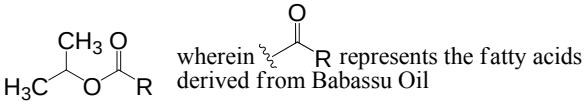
185. Isooctyl Tallate (one example of an "iso")



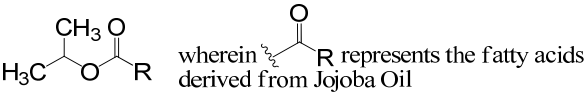
186. Isopropyl Avocadate (one example of an "iso")



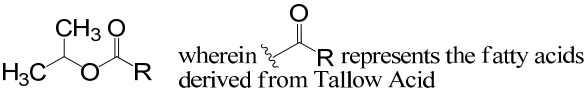
187. Isopropyl Babassuate (one example of an "iso")



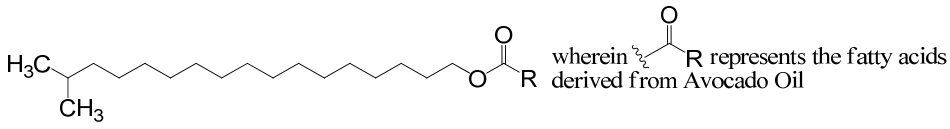
188. Isopropyl Jojobate



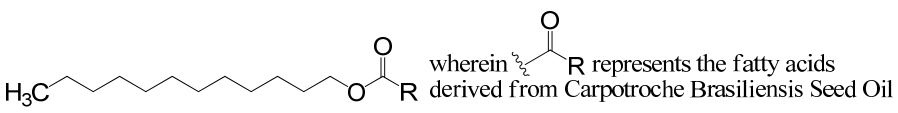
189. Isopropyl Tallowate



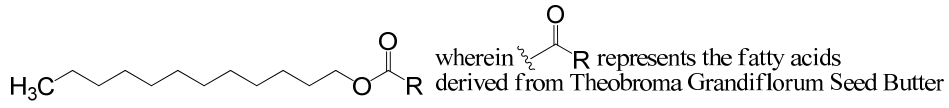
190. Isostearyl Avocadate (one example of an "iso")



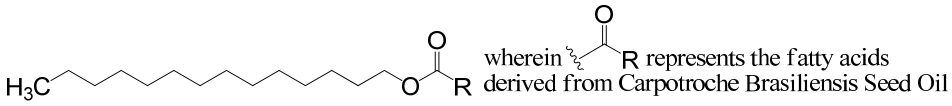
191. Lauryl Carpotroche Brasiliensis Seedate



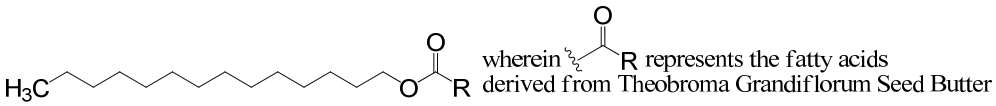
192. Lauryl Theobroma Grandiflorum Seedate



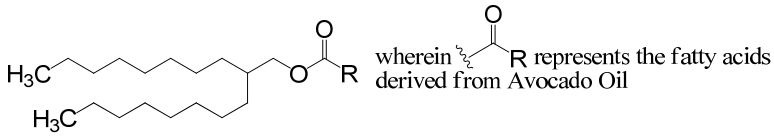
193. Myristyl Carpotroche Brasiliensis Seedate



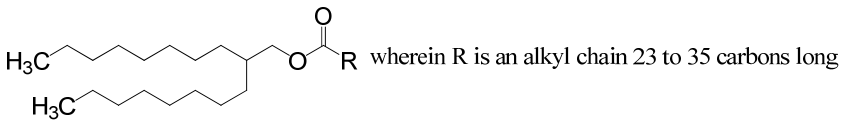
194. Myristyl Theobroma Grandiflorum Seedate



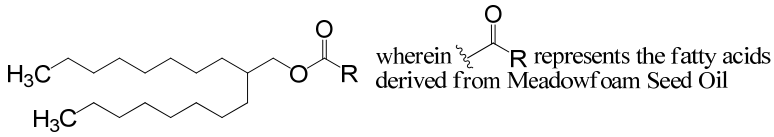
195. Octyldodecyl Avocadoate



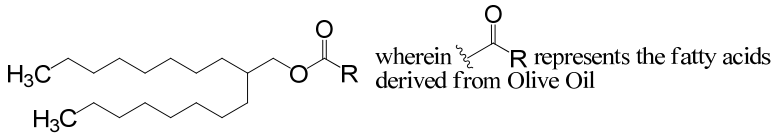
196. Octyldodecyl Beeswax



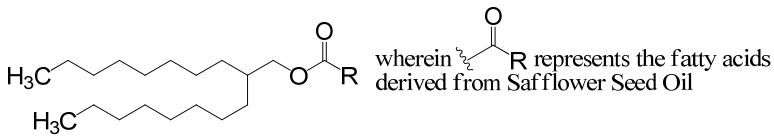
197. Octyldodecyl Meadowfoamate



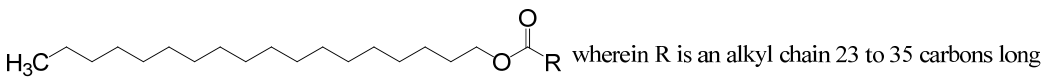
198. Octyldodecyl Olivate



199. Octyldodecyl Safflowerate

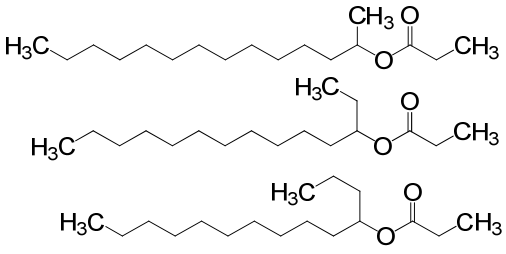


200. Stearyl Beeswax

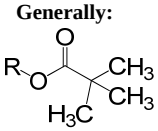


201. Tetradecylpropionates

Chiefly:



Generally:



wherein R is branched alkyl chain 14 carbons long

TABLES

Table 1a. Alkyl Esters Group (presented alphabetically)

Cetyl Esters	Decyltetradecyl Cetearate	Isopropyl Oleate
Arachidyl Behenate	Decyltetradecyl Ethylhexanoate	Isopropyl Sorbate
Arachidyl Erucate	Ethylhexyl Adipate/Palmitate/Stearate	Isopropyl Tallowate
Batyl Isostearate	Ethylhexyl C10-40 Isoalkyl Acidate	Isostearyl Avocadate
Batyl Stearate	Ethylhexyl Ethylhexanoate	Isostearyl Behenate
Behenyl Beeswax	Ethylhexyl Hydroxystearate	Isostearyl Erucate
Behenyl Behenate	Ethylhexyl Isopalmitate	Isostearyl Ethylhexanoate
Behenyl Erucate	Ethylhexyl Isostearate	Isostearyl Hydroxystearate
Behenyl Isostearate	Ethylhexyl Laurate	Isostearyl Isostearate
Behenyl/Isostearyl Beeswax	Ethylhexyl Neopentanoate	Isostearyl Laurate
Behenyl Olivate	Ethylhexyl Oleate	Isostearyl Linoleate
Butyl Avocadate	Ethylhexyl Olivate	Isostearyl Palmitate
Butyl Babassuate	Erucyl Arachidate	Isotridecyl Laurate
Butyl Isostearate	Erucyl Erucate	Isotridecyl Stearate
Butyl Oleate	Erucyl Oleate	Lauryl Behenate
Butyloctyl Beeswax	Heptyl Undecylenate	Lauryl Carpotroche Brasiliensis Seedate
Butyloctyl Behenate	Heptylundecyl Hydroxystearate	Lauryl Ethylhexanoate
Butyloctyl Candelillate	Hexyldecyl Ester of Hydrolyzed Collagen	Lauryl Isostearate
Butyloctyl Cetearate	Hexyldecyl Ethylhexanoate	Lauryl Laurate
Butyloctyl Oleate	Hexyldecyl Hexyldecanoate	Lauryl Oleate
Butyloctyl Palmitate	Hexyldecyl Isostearate	Lauryl Palmitate
C14-30 Alkyl Beeswax	Hexyldecyl Laurate	Lauryl Stearate
C18-38 Alkyl Beeswax	Hexyldecyl Oleate	Lauryl Theobroma Grandiflorum Seedate
C30-50 Alkyl Beeswax	Hexyldecyl Palmitate	Lignoceryl Erucate
C20-40 Alkyl Behenate	Hexyldecyl Stearate	Myristyl Carpotroche Brasiliensis Seedate
C18-38 Alkyl C24-54 Acid Ester	Hexyldodecyl/Octyldecyl Hydroxystearate	Myristyl Ethylhexanoate
C12-13 Alkyl Ethylhexanoate	Hexyl Isostearate	Myristyl Isostearate
C12-15 Alkyl Ethylhexanoate	Hexyl Laurate	Myristyl Laurate
C14-18 Alkyl Ethylhexanoate	Hydrogenated Castor Oil Behenyl Esters	Myristyl Neopentanoate
C16-36 Alkyl Stearate	Hydrogenated Castor Oil Cetyl Esters	Myristyl Theobroma Grandiflorum Seedate
C20-40 Alkyl Stearate	Hydrogenated Castor Oil Stearyl Esters	Octyldecyl Oleate
C30-50 Alkyl Stearate	Hydrogenated Ethylhexyl Olivate	Octyldodecyl Avocadoate
C40-60 Alkyl Stearate	Hydrogenated Ethylhexyl Sesamate	Octyldodecyl Beeswax
Caprylyl Butyrate	Hydrogenated Isocetyl Olivate	Octyldodecyl Behenate
Caprylyl Caprylate	Hydrogenated Isopropyl Jojobate	Octyldodecyl Erucate
Caprylyl Eicosenoate	Hydroxycetyl Isostearate	Octyldodecyl Ethylhexanoate
Cetearyl Behenate	Hydroxyoctacosanyl Hydroxystearate	Octyldodecyl Hydroxystearate
Cetearyl Candelillate	Isoamyl Laurate	Octyldodecyl Isostearate
Cetearyl Olivate	Isobutyl Palmitate	Octyldodecyl Meadowfoamate
Cetearyl Palmate	Isobutyl Tallowate	Octyldodecyl Neodecanoate
Cetearyl Palmitate	Isocetyl Behenate	Octyldodecyl Neopentanoate
Cetearyl Rice Branate	Isocetyl Ethylhexanoate	Octyldodecyl Octyldodecanoate
Cetearyl Stearate	Isocetyl Isodecanoate	Octyldodecyl Oleate
Cetyl Babassuate	Isocetyl Isostearate	Octyldodecyl Olivate
Cetyl Behenate	Isocetyl Laurate	Octyldodecyl Safflowerate
Cetyl Caprate	Isocetyl Palmitate	Octyldodecyl Stearate
Cetyl Caprylate	Isodecyl Ethylhexanoate	Oleyl Arachidate
Cetyl Dimethyloctanoate	Isodecyl Hydroxystearate	Oleyl Erucate
Cetyl Ethylhexanoate	Isodecyl Laurate	Oleyl Linoleate
Cetyl Laurate	Isodecyl Neopentanoate	Oleyl Oleate
Cetyl Oleate	Isodecyl Palmitate	Oleyl Stearate
Cetyl Tallowate	Isodecyl Stearate	Propylheptyl Caprylate
Chimyl Isostearate	Isohexyl Caprate	Stearyl Beeswax
Chimyl Stearate	Isohexyl Laurate	Stearyl Erucate
C10-40 Isoalkyl Acid Octyldodecanol Esters	Isohexyl Neopentanoate	Stearyl Ethylhexanoate
C4-5 Isoalkyl Cocoate	Isohexyl Palmitate	Stearyl Linoleate
C32-36 Isoalkyl Stearate	Isolauryl Behenate	Tetradecyleicosyl Stearate
Coco-Caprylate	Isooctyl Caprylate/Caprate	Tetradecyloctadecyl Behenate
Coco-Caprylate/Caprate	Isooctyl Tallate	Tetradecyloctadecyl Hexyldecanoate
Coco-Rapeseedate	Isopropyl Arachidate	Tetradecyloctadecyl Stearate
Decyl Castorate	Isopropyl Avocadate	Tetradecylpropionates
Decyl Hempseedate	Isopropyl Babassuate	Tridecyl Behenate
Decyl Isostearate	Isopropyl Behenate	Tridecyl Erucate
Decyl Jojobate	Isopropyl Hydroxystearate	Tridecyl Ethylhexanoate
Decyl Laurate	Isopropyl Jojobate	Tridecyl Laurate
Decyl Olivate	Isopropyl Laurate	Tridecyl Neopentanoate
Decyl Palmitate	Isopropyl Linoleate	Tridecyl Stearate

Table 1b. Alkyl Esters Group (grouped by whether individual constituents have been reviewed)

INGREDIENTS FOR WHICH ALL CONSITUENTS HAVE BEEN REVIEWED BY THE CIR		
Cetyl Esters	Cetyl Oleate	Isostearyl Isostearate
Batyl Isostearate	Chimyl Isostearate	Isostearyl Laurate
Batyl Stearate	Chimyl Stearate	Isostearyl Palmitate
Behenyl Isostearate	Coco-Rapeseedate	Myristyl Isostearate
Behenyl Olivate	Hydrogenated Castor Oil Behenyl Esters	Myristyl Laurate
Butyl Isostearate	Hydrogenated Castor Oil Cetyl Esters	Octyldecyl Oleate
Butyl Oleate	Hydrogenated Castor Oil Stearyl Esters	Octyldodecyl Hydroxystearate
Cetearyl Olivate	Hydroxycetyl Isostearate	Octyldodecyl Isostearate
Cetearyl Palmate	Isopropyl Babassuate	Octyldodecyl Oleate
Cetearyl Palmitate	Isopropyl Hydroxystearate	Octyldodecyl Olivate
Cetearyl Rice Branate	Isopropyl Laurate	Octyldodecyl Safflowerate
Cetearyl Stearate	Isopropyl Oleate	Octyldodecyl Stearate
Cetyl Babassuate	Isopropyl Sorbate	Oleyl Oleate
Cetyl Laurate	Isostearyl Hydroxystearate	Oleyl Stearate

INGREDIENTS FOR WHICH ONE CONSTITUENT HAS BEEN REVIEWED		
Behenyl Beeswax	Ethylhexyl Olivate	Isostearyl Behenate
Behenyl Behenate	Erucyl Oleate	Isostearyl Erucate
Behenyl Erucate	Heptylundecyl Hydroxystearate	Isostearyl Ethylhexanoate
Behenyl/Isostearyl Beeswax	Hexyldecyl Ester of Hydrolyzed Collagen	Isostearyl Linoleate
Butyl Avocadate	Hexyldecyl Isostearate	Isotridecyl Laurate
Butyl Babassuate	Hexyldecyl Laurate	Isotridecyl Stearate
Butyloctyl Behenate	Hexyldecyl Oleate	Lauryl Isostearate
Butyloctyl Cetearate	Hexyldecyl Palmitate	Lauryl Laurate
Butyloctyl Oleate	Hexyldecyl Stearate	Lauryl Oleate
Butyloctyl Palmitate	Hexyldodecyl/Octyldecyl Hydroxystearate	Lauryl Palmitate
C16-36 Alkyl Stearate	Hexyl Isostearate	Lauryl Stearate
C20-40 Alkyl Stearate	Hexyl Laurate	Myristyl Carpotroche Brasiliensis Seedate
C30-50 Alkyl Stearate	Hydrogenated Ethylhexyl Olivate	Myristyl Ethylhexanoate
C40-60 Alkyl Stearate	Hydrogenated Ethylhexyl Sesamate	Myristyl Neopentanoate
Cetearyl Behenate	Hydrogenated Isocetyl Olivate	Myristyl Theobroma Grandiflorum Seedate
Cetearyl Candelillate	Hydrogenated Isopropyl Jojobate	Octyldecyl Oleate
Cetyl Behenate	Hydroxyoctacosanyl Hydroxystearate	Octyldodecyl Avocadoate
Cetyl Caprate	Isoamyl Laurate	Octyldodecyl Beeswax
Cetyl Caprylate	Isobutyl Palmitate	Octyldodecyl Behenate
Cetyl Dimethyloctanoate	Isocetyl Isostearate	Octyldodecyl Erucate
Cetyl Ethylhexanoate	Isocetyl Laurate	Octyldodecyl Ethylhexanoate
Cetyl Tallowate	Isocetyl Palmitate	Octyldodecyl Meadowfoamate
C10-40 Isoalkyl Acid Octyldodecanol Esters	Isodecyl Hydroxystearate	Octyldodecyl Neodecanoate
C4-5 Isoalkyl Cocoate	Isodecyl Laurate	Octyldodecyl Neopentanoate
C32-36 Isoalkyl Stearate	Isodecyl Palmitate	Octyldodecyl Octyldodecanoate
Coco-Caprylate	Isodecyl Stearate	Oleyl Arachidate
Coco-Caprylate/Caprate	Isohexyl Laurate	Oleyl Erucate
Decyl Isostearate	Isohexyl Palmitate	Oleyl Linoleate
Decyl Laurate	Isooctyl Tallate	Stearyl Beeswax
Decyl Palmitate	Isopropyl Arachidate	Stearyl Erucate
Decyltetradecyl Cetearate	Isopropyl Avocadate	Stearyl Ethylhexanoate
Ethylhexyl Adipate/Palmitate/Stearate	Isopropyl Behenate	Stearyl Linoleate
Ethylhexyl Hydroxystearate	Isopropyl Jojobate	Tetradecyleicosyl Stearate
Ethylhexyl Isostearate	Isopropyl Linoleate (previously reviewed)	Tetradecyloctadecyl Stearate
Ethylhexyl Laurate	Isopropyl Tallowate	Tridecyl Laurate
Ethylhexyl Oleate	Isostearyl Avocadate	Tridecyl Stearate

INGREDIENTS FOR WHICH NONE OF THE INDIVIDUAL CONSTITUENTS HAVE BEEN REVIEWED		
Arachidyl Behenate	Decyl Jojobate	Isohexyl Caprylate
Arachidyl Erucate	Decyltetradecyl Ethylhexanoate	Isohexyl Neopentanoate
Butyloctyl Beeswax	Ethylhexyl C10-40 Isoalkyl Acidate	Isolauryl Behenate
Butyloctyl Candelillate	Ethylhexyl Ethylhexanoate	Isooctyl Caprylate/Caprate
C14-30 Alkyl Beeswax	Ethylhexyl Isopalmitate	Lauryl Behenate
C18-38 Alkyl Beeswax	Ethylhexyl Neopentanoate	Lauryl Carpotroche Brasiliensis Seedate
C30-50 Alkyl Beeswax	Erucyl Arachidate	Lauryl Ethylhexanoate
C20-40 Alkyl Behenate	Erucyl Erucate	Lauryl Theobroma Grandiflorum Seedate
C18-38 Alkyl C24-54 Acid Ester	Heptyldecyl Undecylenate	Lignoceryl Erucate
C12-13 Alkyl Ethylhexanoate	Hexyldecyl Ethylhexanoate	Propylheptyl Caprylate
C12-15 Alkyl Ethylhexanoate	Hexyldecyl Hexyldecanoate	Tetradecyloctadecyl Behenate
C14-18 Alkyl Ethylhexanoate	Isobutyl Tallowate	Tetradecyloctadecyl Hexyldecanoate
Caprylyl Butyrate	Isocetyl Behenate	Tetradecylpropionates
Caprylyl Caprylate	Isocetyl Ethylhexanoate	Tridecyl Behenate
Caprylyl Eicosenoate	Isocetyl Isodecanoate	Tridecyl Erucate
Decyl Castorate	Isodecyl Ethylhexanoate	Tridecyl Ethylhexanoate
Decyl Hempseedate	Isodecyl Neopentanoate	Tridecyl Neopentanoate

Table 2. Alkyl Esters Previously Reviewed in Other Safety Assessments

Arachidyl Propionate	Isobutyl Myristate	Isotridecyl Myristate
Butyl Myristate	Isobutyl Perlargonate	Lauryl Cocoate
Butyl Stearate	Isobutyl Stearate	Lauryl Myristate
Cetearyl Ethylhexanoate	Isocetyl Myristate	Myristyl Myristate
Cetearyl Isononanoate	Isocetyl Stearate	Myristyl Stearate
Cetearyl Nonanoate	Isodecyl Cocoate	Octyldodecyl Cocoate
Cetyl Isononanoate	Isodecyl Isononanoate	Octyldodecyl Myristate
Cetyl Myristate	Isodecyl Myristate	Octyldodecyl Ricinoleate
Cetyl Palmitate	Isodecyl Oleate	Oleyl Myristate
Cetyl Ricinoleate	Isononyl Isononanoate	Stearyl Behenate
Cetyl Stearate	Isopropyl Isostearate	Stearyl Caprylate
Decyl Cocoate	Isopropyl Myristate	Stearyl Heptanoate
Decyl Myristate	Isopropyl Palmitate	Stearyl Olivate
Decyl Oleate	Isopropyl Ricinoleate	Stearyl Palmitate
Ethylhexyl Cocoate	Isopropyl Stearate	Stearyl Stearate
Ethylhexyl Isononanoate	Isostearyl Isononanoate	Tetradecyloctadecyl Myristate
Ethylhexyl Myristate	Isostearyl Myristate	Tridecyl Cocoate
Ethylhexyl Palmitate	Isostearyl Neopentanoate	Tridecyl Isononanoate
Ethylhexyl Pelargonate	Isotridecyl Isononanoate	Tridecyl Myristate
Ethylhexyl Stearate		

Table 3a. Conclusions of previously reviewed constituents

Constituent	Conclusion (year issued)	Reference
	ACIDS	
Adipic Acid	safe as used (2010)	30
Babassu Acid	safe as used (2011)	31
Coconut Acid	safe as used (2011)	31,32
Hydroxystearic Acid	safe as used (1998)	33
Hydrolyzed Collagen	safe as used (1985; reaffirmed in 2006)	34,35
Isostearic Acid	safe as used (1983; reaffirmed in 2005)	4,36
Lauric Acid	safe as used (1987; reaffirmed in 2006)	34,37
Myristic Acid	safe as used (2010)	5
Oleic Acid	safe as used (1987; reaffirmed in 2006)	34,37
Olive Acid	safe as used (2011)	31
Palm Acid	safe as used (2011)	31
Palmitic Acid	safe as used (1987; reaffirmed in 2006)	34,37
Rice Bran Acid	safe as used (2011)	31
Safflower Acid	safe as used (2011)	31
Sorbic Acid	safe as used (1988; reaffirmed in 2008)	38,39
Stearic Acid	safe as used (1987; reaffirmed in 2006)	34,37
	ALCOHOLS	
Batyl Alcohol	safe as used (2011)	40
Behenyl Alcohol	safe as used (1988; reaffirmed 2008)	39,41
Butyl Alcohol	safe as used (2008)	42
Cetearyl Alcohol	safe as used (1988; reaffirmed 2008)	39,41
Cetyl Alcohol	safe as used (1988; reaffirmed 2008)	39,41
Cetyl Glycol (Hydroxycetyl Alcohol)	safe as used (2011)	43
Chimyl Alcohol	safe as used (2011)	40
Coconut Alcohol	safe as used (2011)	32
Isopropyl Alcohol	safe as used (2010)	44
Isostearyl Alcohol	safe as used (1988; reaffirmed 2008)	39,41
Jojoba Alcohol	safe as used (2008)	45
Myristyl Alcohol	safe as used (1988; reaffirmed 2008)	39,41
Octyl Dodecanol	safe as used (1985, reaffirmed 2006)	34,46
Oleyl Alcohol	safe as used (1985; reaffirmed 2006)	34,46
Stearyl Alcohol	safe as used (1985; reaffirmed 2006)	34,46

Table 3b. Conclusions of previously reviewed alkyl esters (year issued)

Alkyl Ester	Conclusion (Year)	Reference
Arachidyl Propionate	safe as used (1990; reaffirmed 2008)	39,47
Butyl Myristate	safe as used (2010)	5
Butyl Stearate	safe as used (1985, reaffirmed 2005)	4,6
Cetearyl Ethylhexanoate	safe as used (1982, reaffirmed 2006)	34,48
Cetearyl Isononanoate	safe as used (2010)	49
Cetearyl Nonanoate	safe as used (2010)	49
Cetyl Isononanoate	safe as used (2010)	49
Cetyl Myristate	safe as used (2010)	5
Cetyl Palmitate	safe as used (1982; reaffirmed in 2005)	3,4
Cetyl Ricinoleate	safe as used (2007)	50
Cetyl Stearate	safe as used (1985, reaffirmed 2005)	4,6
Decyl Cocoate	safe as used (2011)	32
Decyl Myristate	safe as used (2010)	5
Decyl Oleate	safe as used (1982; reaffirmed in 2003)	51,52
Ethylhexyl Cocoate	safe as used (2011)	32
Ethylhexyl Isononanoate	safe as used (2010)	49
Ethylhexyl Myristate	safe as used (2010)	5
Ethylhexyl Palmitate	safe as used (1982; reaffirmed in 2005)	3,4
Ethylhexyl Pelargonate	safe as used (2010)	49
Ethylhexyl Stearate	safe as used (1985, reaffirmed 2005)	4,6
Isobutyl Myristate	safe as used (2010)	5
Isobutyl Perlargonate	safe as used (2010)	49
Isobutyl Stearate	safe as used (1985, reaffirmed 2005)	4,6
Isocetyl Myristate	safe as used (2010)	5
Isocetyl Stearate	safe as used (1985, reaffirmed 2005)	4,6
Isodecyl Cocoate	safe as used (2011)	32
Isodecyl Isononanoate	safe as used (2010)	49
Isodecyl Myristate	safe as used (2010)	5
Isodecyl Oleate	safe as used (1982; reaffirmed in 2003)	51,52
Isononyl Isononanoate	safe as used (2010)	49
Isopropyl Isostearate	safe as used (1992, reaffirmed in 2011)	53,54
Isopropyl Myristate	safe as used (2010)	5
Isopropyl Palmitate	safe as used (1982; reaffirmed in 2005)	3,4
Isopropyl Ricinoleate	safe as used (2007)	50
Isopropyl Stearate	safe as used (1985, reaffirmed 2005)	4,6
Isostearyl Isononanoate	safe as used (2010)	49
Isostearyl Myristate	safe as used (2010)	5
Isostearyl Neopentanoate	safe as used (1985, reaffirmed in 2006)	34,55
Isotridecyl Isononanoate	safe as used (2010)	49
Isotridecyl Myristate	safe as used (2010)	5
Lauryl Cocoate	safe as used (2011)	32
Lauryl Myristate	safe as used (2010)	5
Myristyl Myristate	safe as used (2010)	5
Myristyl Stearate	safe as used (1985, reaffirmed 2005)	4,6
Octyldodecyl Cocoate	safe as used (2011)	32
Octyldodecyl Myristate	safe as used (2010)	5
Octyldodecyl Ricinoleate	safe as used (2007)	50
Oleyl Myristate	safe as used (2010)	5
Stearyl Behenate	safe as used (2010)	7
Stearyl Caprylate	safe as used (2010)	7
Stearyl Heptanoate	safe as used (2010)	7,56
Stearyl Olivate	safe as used (2010)	7
Stearyl Palmitate	safe as used (2010)	7
Stearyl Stearate	safe as used (2010)	7
Tetradecyloctadecyl Myristate	safe as used (2010)	5
Tridecyl Cocoate	safe as used (2011)	32
Tridecyl Isononanoate	safe as used (2010)	49
Tridecyl Myristate	safe as used (2010)	5

Table 4. Definitions and functions

Ingredient/CAS No.	Definition	Function[9]
Cetyl Esters	***the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 14 to 18 carbons in the alkyl chain, with a mixture of straight-chain fatty acids, containing 14 to 18 carbons in the alkyl chain. Cetyl Esters is a synthetic wax intended to be indistinguishable from natural spermaceti wax with regard to composition and properties.***	***skin cond. agent– emol.***
Arachidyl Behenate 42233-14-7	the ester obtained from the reaction of arachidyl alcohol with behenic acid[9]	skin cond. agent – oc.; visc. incr. agent – nonaq.
Arachidyl Erucate 86601-86-7	the ester obtained from the reaction of arachidyl alcohol with erucic acid[9]	skin cond. agent – emol.
Batyl Isostearate 170754-20-8	an ester obtained from the reaction of batyl alcohol with isostearic acid[9]	skin cond. agent – oc.
Batyl Stearate 13232-26-3	an ester obtained from the reaction of batyl alcohol with stearic acid[9]	skin cond. agent – oc.
Behenyl Beeswax	the ester obtained from the reaction of behenyl alcohol with a mixture of straight-chain fatty acids, containing 24 to 36 carbons in alkyl chain length (beeswax acid)	skin cond. agent – oc.
Behenyl Behenate 17671-27-1	the ester obtained from the reaction of behenic acid and behenyl alcohol skin[9]	skin cond. agent – oc.
Behenyl Erucate 18312-32-8	the ester obtained from the reaction of behenyl alcohol with erucic acid[9]	skin cond. agent – oc.
Behenyl Isostearate 181496-25-3	the ester obtained from the reaction of behenyl alcohol with isostearic acid[9]	skin cond. agent – oc.
Behenyl/Isostearyl Beeswax	the mixture of esters obtained from the reaction of behenyl alcohol and isostearyl alcohol with a mixture of straight-chain fatty acids, containing 24 to 36 carbons in alkyl chain length (beeswax acid).	skin cond. agent – oc.
Behenyl Olivate	the mixture of esters obtained from the reaction of behenyl alcohol with the fatty acids derived from Olea Europaea (Olive) Oil (also known as Olive Acid).	skin cond. agent – misc.; emul. stabilizer; film former; slip modifier; visc, incr. agent – nonaq.
Butyl Avocadate	the mixture of esters obtained from the reaction of butyl alcohol with the fatty acids derived from Persea Grattisima (Avocado) Oil	skin cond. agent – misc.
Butyl Babassuate	the mixture of esters obtained from the reaction of butyl alcohol with the fatty acids derived from babassu oil[9]	disp. agent-nonsurf.; emul. stab.; skin cond, agent -emol; surf.-solub. agent
Butyl Isostearate	the ester obtained from the reaction of butyl alcohol with isostearic acid[9]	skin cond, agent -emol
Butyl Oleate 142-77-8	ester obtained from the reaction of butyl alcohol with oleic acid[9]	skin cond, agent –emol.; fragrance ingr.
Butyloctyl Beeswax 151661-98-2	the mixture of esters obtained from the reaction of 2-butyloctanol with a mixture of straight-chain fatty acids, containing 24 to 36 carbons in alkyl chain length (beeswax acid)	skin cond. agent – oc.
Butyloctyl Behenate	the ester obtained from the reaction of 2-butyloctanol with behenic acid	skin cond. agent – emol.
Butyloctyl Candelillate 226994-03-2	the mixture of esters obtained from the reaction of 2-butyloctanol with the fatty acids derived from Euphorbia Cerifera (Candelilla) Wax[9]	skin cond. agent – oc.
Butyloctyl Cetearate 101227-08-1	the mixture of esters obtained from the reaction of 2-butyloctanol with palmitic acid and stearic acid	skin cond. agent – emol.
Butyloctyl Oleate	the ester obtained from the reaction of 2-butyloctanol with oleic acid[9]	skin cond. agent – oc.
Butyloctyl Palmitate	the ester obtained from the reaction of 2-butyloctanol with palmitic acid	skin cond. agent – emol.
C14-30 Alkyl Beeswax 209225-40-1	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 14 to 30 carbons in the alkyl chain, with a mixture of straight-chain fatty acids, containing 24 to 36 carbons in alkyl chain (beeswax acid)	skin cond. agent – oc.
C18-38 Alkyl Beeswax 223706-17-0	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 18 to 38 carbons in the alkyl chain, with a mixture of straight-chain fatty acids, containing 24 to 36 carbons in alkyl chain (beeswax acid).	skin cond. agent – oc.
C30-50 Alkyl Beeswax 223707-19-5	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 30 to 50 carbons in the alkyl chain, with a mixture of straight-chain fatty acids, containing 24 to 36 carbons in alkyl chain (beeswax acid)	skin cond. agent – oc.
C20-40 Alkyl Behenate	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 20 to 40 carbons in the alkyl chain, with behenic acid	skin cond. agent – oc.
C18-38 Alkyl C24-54 Acid Ester	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 30 to 50 carbons in the alkyl chain, with a mixture of straight-chain fatty acids, containing 24 to 54 carbons in alkyl chain	visc. incr. agent – nonaq.
C12-13 Alkyl Ethylhexanoate 90411-66-8	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 12 to 13 carbons in the alkyl chain, with 2-ethylhexanoic acid	skin cond. agent – emol.
C12-15 Alkyl Ethylhexanoate 90411-66-8	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 12 to 15 carbons in the alkyl chain, with 2-ethylhexanoic acid	skin cond. agent – emol.
C14-18 Alkyl Ethylhexanoate	the ester of C14-18 alcohols and 2-ethylhexanoic acid	skin cond. agent – emol.
C16-36 Alkyl Stearate	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 16 to 36 carbons in the alkyl chain, with stearic acid	skin cond. agent – oc.
C20-40 Alkyl Stearate	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 20 to 40 carbons in the alkyl chain, with stearic acid	skin cond. agent – oc.; visc. incr. agent-aq.
C30-50 Alkyl Stearate	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 30 to 50 carbons in the alkyl chain, with stearic acid	skin cond. agent – oc.

Table 4. Definitions and functions

Ingredient/CAS No.	Definition	Function[9]
C40-60 Alkyl Stearate	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 40 to 60 carbons in the alkyl chain, with stearic acid	skin cond. agent – oc.
Caprylyl Butyrate 110-39-4	the ester obtained from the reaction of n-octanol with butyric acid[9]	skin cond. agent – misc.; fragrance ingredient
Caprylyl Caprylate 2306-88-9	the ester obtained from the reaction of n-octanol with n-octanoic acid	skin cond. agent – emol.
Caprylyl Eicosenoate	the ester obtained from the reaction of n-octanol with 11-eicosenoic acid	skin cond. agent – misc.
Cetearyl Behenate	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 16 to 18 carbons in the alkyl chain, with behenic acid	skin cond. agent – oc.
Cetearyl Candelillate	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 12 to 13 carbons in the alkyl chain, with the fatty acids derived from Euphorbia Cerifera (Candelilla) Wax	skin cond. agent – oc.
Cetearyl Olivate	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 12 - 13 carbons in the alkyl chain, with the fatty acids derived from olive oil	hair cond. agent
Cetearyl Palmate	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 12 to 13 carbons in the alkyl chain, with palm acid	skin cond. agent – emol.; emul. stab.
Cetearyl Palmitate 85341-79-3	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 12 to 13 carbons in the alkyl chain, with palmitic acid	skin cond. agent-emol.; hair cond. agent
Cetearyl Rice Branate	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 12 to 13 carbons in the alkyl chain, with rice bran acid	skin cond. agent – misc.
Cetearyl Stearate 93820-97-4	the mixture of esters obtained from the reaction of a mixture of fatty alcohols, containing 12 to 13 carbons in the alkyl chain, with stearic acid	skin cond. agent – oc.
Cetyl Babassuate 613236-40-1	the mixture of esters of cetyl alcohol and the fatty acids derived from Orbignya Oleifera (Babassu) Oil[9]	skin cond. agent – emol.; visc. incr. agent-aq.
Cetyl Behenate 42233-11-4	the ester obtained from the reaction of cetyl alcohol and behenic acid	skin cond. agent – oc.
Cetyl Caprate	the ester obtained from the reaction of cetyl alcohol and capric acid[9]	skin cond. agent – emol.
Cetyl Caprylate 29710-31-4	the ester obtained from the reaction of cetyl alcohol and caprylic acid[9]	skin cond. agent – emol.
Cetyl Dimethyloctanoate	the ester obtained from the reaction of cetyl alcohol and dimethyloctanoic acid[9]	skin cond. agent – emol.
Cetyl Ethylhexanoate 59130-69-7	the ester obtained from the reaction of cetyl alcohol with 2-ethylhexanoic acid[9]	skin cond. agent – emol.
Cetyl Laurate 20834-06-4	the ester obtained from the reaction of cetyl alcohol with lauric acid[9]	skin cond. agent – emol.
Cetyl Oleate 22393-86-8	the ester obtained from the reaction of cetyl alcohol with oleic acid[9]	skin cond. agent – emol.
Cetyl Tallowate	the mixture of esters obtained from the reaction of cetyl alcohol with tallow acid	skin cond. agent – misc.
Chimyl Isostearate	the ester of chimyl alcohol with isostearic acid[9]	skin cond. agent – emol.
Chimyl Stearate 131932-18-8	the ester obtained from the reaction of chimyl alcohol with stearic acid[9]	skin cond. agent – emol.
C10-40 Isoalkyl Acid Octyldodecanol Esters	the mixture of esters obtained from the reaction of 2-octyldodecanol with branched-chain fatty acids, containing 10 to 40 carbons in the alkyl chain	skin cond. agent – misc.; visc. incr. agent-nonaq.
C4-5 Isoalkyl Cocoate	the mixture of esters obtained from the reaction of a branched, fatty alcohol containing 4 to 5 carbons, with coconut acid[9]	skin cond. agent – emol.
C32-36 Isoalkyl Stearate 68201-22-9	the mixture of esters obtained from the reaction of a branched, saturated fatty alcohol, containing 32 to 36 carbons, with stearic acid[9]	skin cond. agent – emol.
Coco-Caprylate	the mixture of esters obtained from the reaction of coconut alcohol with caprylic acid	skin cond. agent – emol.
Coco-Caprylate/Caprate	a mixture of esters obtained from the reaction of coconut alcohol with caprylic acid and capric acid[9]	skin cond. agent – emol.
Coco-Rapeseedate	the mixture of esters obtained from the reaction of coconut alcohol with the fatty acids derived from Brassica Campestris (Rapeseed) Oil[9]	skin cond. agent – emol.
Decyl Castorate	the mixture of esters obtained from the reaction of decyl alcohol with the fatty acids derived from Ricinus Communis (Castor) Oil[9]	skin cond. agent – emol.; emul. stab.
Decyl Hempseedate	the mixture of esters obtained from the reaction of decyl alcohol with the fatty acids derived from Cannabis Sativa Seed Oil[9]	skin cond. agent – emol.; emul. stab.
Decyl Isostearate 84605-08-3	the ester obtained from the reaction of decyl alcohol with isostearic acid[9]	skin cond. agent – emol.
Decyl Jojobate	the mixture of esters obtained from the reaction of decyl alcohol with the fatty acids derived from Simmondsia Chinensis (Jojoba) Oil	skin cond. agent – emol.
Decyl Laurate 36528-28-6	the ester obtained from the reaction of decyl alcohol with lauric acid	skin cond. agent – emol.
Decyl Olivate	the mixture of esters obtained from the reaction of decyl alcohol with the fatty acids derived from Olea Europea (Olive) Oil	skin cond. agent – oc.
Decyl Palmitate 42232-27-9	the ester obtained from the reaction of decyl alcohol with palmitic acid[9]	skin cond. agent – emol.
Decyltetradecyl Cetearate 97404-34-7	the mixture of esters obtained from the reaction of 2-decyltetradecanol with a mixture of fatty acids, containing predominantly palmitic acid and stearic acid	skin cond. agent – emol.
Decyltetradecyl Ethylhexanoate	the ester obtained from the reaction of 2-decyltetradecanol with 2-ethylhexanoic acid	skin cond. agent – emol.
Ethylhexyl Adipate/Palmitate/ Stearate	a mixture of esters obtained from the reaction of 2-ethylhexyl alcohol with adipic, palmitic, and stearic acids[9]	skin cond. agent-emol.

Table 4. Definitions and functions

Ingredient/CAS No.	Definition	Function[9]
Ethylhexyl C10-40 Isoalkyl Acidate	mixture of esters obtained from the reaction of 2-ethylhexyl alcohol with branched, fatty acids, containing 10 to 40 carbons in the alkyl chain	skin cond. agent-misc.; visc. incr. agent-nonaq.
Ethylhexyl Ethylhexanoate 7425-14-1	the ester of 2-ethylhexanol with 2-ethylhexanoic acid[9]	skin cond. agent-emol.; fragrance ingr.
Ethylhexyl Hydroxystearate 29383-26-4; 29710-25-6	the ester obtained from the reaction of 2-ethylhexyl alcohol with 12-hydroxystearic acid[9]	skin cond. agent-emol.
Ethylhexyl Isopalmitate 93843-32-4	the ester obtained from the reaction of 2-ethylhexanol with a branched, fatty acid, containing 16 carbons in the alkyl chain	skin cond. agent-emol.
Ethylhexyl Isostearate 81897-25-8; 85186-76-1	the ester obtained from the reaction of 2-ethylhexyl alcohol with isostearic acid[9]	skin cond. agent-emol.
Ethylhexyl Laurate 20292-08-4	the ester obtained from the reaction of 2-ethylhexyl alcohol with lauric acid[9]	skin cond. agent-emol.
Ethylhexyl Neopentanoate	the ester obtained from the reaction of 2-ethylhexanol with neopentanoic acid[9]	skin cond. agent-emol.
Ethylhexyl Oleate 26399-02-0	the ester obtained from the reaction of 2-ethylhexylanol with oleic acid[9]	skin cond. agent-emol.
Ethylhexyl Olivate	the mixture of esters obtained from the reaction of 2-ethylhexyl alcohol with the fatty acids derived from Olea Europaea (Olive) Oil[9]	skin cond. agent-oc.
Erucyl Arachidate	the ester obtained from the reaction of erucyl alcohol with arachidic acid[9]	skin cond. agent-misc.
Erucyl Erucate 27640-89-7; 84605-12-9	the ester obtained from the reaction of erucyl alcohol with erucic acid[9]	skin cond. agent-misc.
Erucyl Oleate 85617-81-8	the ester obtained from the reaction of erucyl alcohol with oleic acid[9]	skin cond. agent-misc.
Heptyl Undecylenate 68141-27-5	the ester obtained from the reaction of heptyl alcohol with 10-undecenoic acid	skin cond. agent-emol.
Heptylundecyl Hydroxystearate 74659-69-1	the ester obtained from the reaction of 2-heptylundecyl alcohol with 12-hydroxy-stearate	skin cond. agent-emol.
Hexyldecyl Ester of Hydrolyzed Collagen 169590-83-4	the mixture of esters obtained from the reaction of 2-hexyldecanol and the hydro-lyzed fatty acids of (hydrolysate of) collagen (derived by acid, enzyme or other method of hydrolysis).	skin cond. agent-misc.; skin cond. agent
Hexyldecyl Ethylhexanoate	the ester obtained from the reaction of 2-hexyldecanol with 2-ethylhexanoic acid[9]	skin cond. agent-emol.; skin cond. agent-oc.
Hexyldecyl Hexyldecanoate	the ester obtained from the reaction of 2-hexyldecanol with 2-hexyldecanoic acid	skin cond. agent-emol.
Hexyldecyl Isostearate 69247-84-3	the ester obtained from the reaction of 2-hexyldecyl alcohol with isostearic acid[9]	skin cond. agent-oc.
Hexyldecyl Laurate 34362-27-1; 227450-65-9	the ester obtained from the reaction of 2-hexyldecanol with lauric acid[9]	skin cond. agent-emol.; skin cond. agent-oc.
Hexyldecyl Oleate 94278-07-6	the ester obtained from the reaction of 2-hexyldecanol with oleic acid[9]	skin cond. agent-oc.
Hexyldecyl Palmitate 69275-02-1	the ester obtained from the reaction of 2-hexyldecanol with palmitic acid[9]	skin cond. agent-oc.
Hexyldecyl Stearate 17618-45-0	the ester obtained from the reaction of 2-hexyldecanol with stearic acid[9]	skin cond. agent-emol.; skin cond. agent-oc.
Hexyldodecyl/Octyldecyl Hydroxystearate	the mixture of esters obtained from the reaction of 2-hexyldodecanol and 2-octyl-decanol with 12-hydroxystearic acid	skin cond. agent-emol.
Hexyl Isostearate 94247-25-3	the ester obtained from the reaction of hexyl alcohol with isostearic acid[9]	skin cond. agent-emol.
Hexyl Laurate 34316-64-8	the ester obtained from the reaction of hexyl alcohol with lauric acid[9]	skin cond. agent-emol.
Hydrogenated Castor Oil Behenyl Esters	the hydrogenation product of the mixture of esters obtained from the reaction of behenyl alcohol with castor oil	hair cond. agent; binder; emul. stab.
Hydrogenated Castor Oil Cetyl Esters	the hydrogenation product of the mixture of esters obtained from the reaction of cetyl alcohol with castor oil	skin cond. agent-misc.; hair cond. agent; binder; emul. stab.
Hydrogenated Castor Oil Stearyl Esters	the hydrogenation product of the mixture of esters obtained from the reaction of stearyl alcohol with castor oil	skin cond. agent-misc.; hair cond. agent; binder; emul. stab.
Hydrogenated Ethylhexyl Olivate	a mixture of esters obtained from the reaction of 2-ethylhexanol and hydrogenated olive oil[9]	skin cond. agent-emol.
Hydrogenated Ethylhexyl Sesamate	the product of the transesterification of 2-ethylhexyl alcohol and hydrogenated sesame seed oil	skin cond. agent-emol.; binder
Hydrogenated Isocetyl Olivate	the end-product of the controlled hydrogenation of the mixture of esters formed by the reaction of isocetyl alcohol with olive acid	skin cond. agent-misc.; binder; disp. agent; humectant
Hydrogenated Isopropyl Jojobate	the end-product of the controlled hydrogenation of the mixture of esters formed by the reaction of isopropyl alcohol with the acids derived from Simmondsia Chinensis (Jojoba) Oil	skin cond. agent-oc.
Hydroxycetyl Isostearate	the ester obtained from the reaction of cetyl glycol with isostearic acid	skin cond. agent-emol.
Hydroxyoctacosanyl Hydroxy-stearate 93840-71-2	the ester obtained from the reaction of 2-hydroxyoctacosanyl alcohol with 12-hydroxystearic acid	skin cond. agent-emol.; visc. incr. agent
Isoamyl Laurate 6309-51-9	the ester obtained from the reaction of isoamyl alcohol with lauric acid[9]	skin cond. agent-emol.; fragrance ingr.
Isobutyl Palmitate 110-34-9	the ester obtained from the reaction of isobutyl alcohol with palmitic acid[9]	skin cond. agent-emol.; fragrance ingr.

Table 4. Definitions and functions

Ingredient/CAS No.	Definition	Function[9]
Isobutyl Tallowate 68526-50-1	the mixture of esters obtained from the reaction of isobutyl alcohol with tallow acid[9]	skin cond. agent-emol.
Isocetyl Behenate 94247-28-6	the ester obtained from the reaction of isocetyl alcohol with behenic acid[9]	skin cond. agent-oc.
Isocetyl Ethylhexanoate 125804-19-5	the ester obtained from the reaction of isocetyl alcohol with 2-ethylhexanoic acid[9]	skin cond. agent-emol.
Isocetyl Isodecanoate 129588-05-2	the mixture of esters obtained from the reaction of isocetyl alcohol with a branched, fatty acid, containing 10 carbons in the alkyl chain.	skin cond. agent-emol.
Isocetyl Isostearate 52006-45-8	the ester obtained from the reaction of isocetyl alcohol with isostearic acid[9]	skin cond. agent-emol.
Isocetyl Laurate 89527-28-6	the ester obtained from the reaction of isocetyl alcohol with lauric acid[9]	skin cond. agent-emol.
Isocetyl Palmitate 127770-27-8	the ester obtained from the reaction of isocetyl alcohol with palmitic acid[9]	skin cond. agent-emol.
Isodecyl Ethylhexanoate 89933-26-6; 34962-91-9	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 10 carbons in the alkyl chain, with 2-ethylhexanoic acid	skin cond. agent-emol.
Isodecyl Hydroxystearate 29383-27-5; 59231-36-6	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 10 carbons in the alkyl chain, with 12-hydroxystearic acid	skin cond. agent-emol.
Isodecyl Laurate 14779-93-2; 94247-10-6	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 10 carbons in the alkyl chain, with lauric acid	skin cond. agent-emol.
Isodecyl Neopentanoate 60209-82-7	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 10 carbons in the alkyl chain, with neopentanoic acid	skin cond. agent-emol.
Isodecyl Palmitate 14779-95-4; 59231-33-3	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 10 carbons in the alkyl chain, with palmitic acid	skin cond. agent-emol.
Isodecyl Stearate 31565-38-5	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 10 carbons in the alkyl chain, with stearic acid	skin cond. agent-emol.
Isohexyl Caprate	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 10 carbons in the alkyl chain, with capric acid	skin cond. agent-emol.
Isohexyl Laurate 59219-73-7	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 6 carbons in the alkyl chain, with lauric acid	skin cond. agent-emol.
Isohexyl Neopentanoate 131141-70-3; 150588-62-8	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 10 carbons in the alkyl chain, with neopentanoic acid	skin cond. agent-emol.
Isohexyl Palmitate 55194-91-7; 59219-72-6	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 10 carbons in the alkyl chain, with palmitic acid	skin cond. agent-emol.
Isolauryl Behenate	I the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 12 carbons in the alkyl chain, with behenic acid	skin cond. agent-oc.
Isooctyl Caprylate/Caprate	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 8 carbons in the alkyl chain, with mixture of caprylic and capric acids	skin cond. agent-emol.; antioxidant
Isooctyl Tallate	the mixture of esters obtained from the reaction of branched, fatty alcohols, containing 8 carbons in the alkyl chain, with the fatty acids derived from tall oil	skin cond. agent-emol.; plasticizer; solvent
Isopropyl Arachidate 26718-90-1	the ester obtained from the reaction of isopropyl alcohol with arachidic acid[9]	skin cond. agent-emol.
Isopropyl Avocadate 90990-05-9	the ester obtained from the reaction of isopropyl alcohol with the fatty acids derived from avocado oil[9]	skin cond. agent-emol.
Isopropyl Babassuate	the ester obtained from the reaction of isopropyl alcohol with the fatty acids derived from Orbignya Oleifera (Babassu) Oil[9]	skin cond. agent-emol.; binder; disp. agent-non-surf; emul. stab.
Isopropyl Behenate 26718-95-6	the ester obtained from the reaction of isopropyl alcohol with behenic acid[9]	skin cond. agent-emol.
Isopropyl Hydroxystearate	the ester obtained from the reaction of isopropyl alcohol with 12-hydroxystearic acid[9]	skin cond. agent-emol.
Isopropyl Jojobate	the ester obtained from the reaction of isopropyl alcohol with the acids derived from Simmondsia Chinensis (Jojoba) Oil[9]	skin cond. agent-emol.
Isopropyl Laurate 10233-13-3	the ester obtained from the reaction of isopropyl alcohol with lauric acid[9]	skin cond. agent-emol.; binder; fragrance ingr.
Isopropyl Linoleate 22882-95-7	the ester obtained from the reaction of isopropyl alcohol with linoleic acid[9]	skin cond. agent-emol.
Isopropyl Oleate 112-11-8; 17364-07-7	the ester obtained from the reaction of isopropyl alcohol with oleic acid[9]	skin cond. agent-emol.; binder
Isopropyl Sorbate 44987-75-9; 55584-26-4	the ester obtained from the reaction of isopropyl alcohol with sorbic acid[9]	preservative
Isopropyl Tallowate	the mixture of esters obtained from the reaction of isopropyl alcohol with tallow acid	skin cond. agent-emol.; binder
Isostearyl Avocadate 90990-06-0	the mixture of esters obtained from the reaction of isostearyl alcohol with the acids derived from avocado oil	skin cond. agent-emol.
Isostearyl Behenate 125804-16-2	the ester obtained from the reaction of isostearyl alcohol with behenic acid[9]	skin cond. agent-oc.
Isostearyl Erucate 84605-10-7	the ester obtained from the reaction of isostearyl alcohol with erucic acid[9]	skin cond. agent-oc.
Isostearyl Ethylhexanoate 69247-83-2	the ester obtained from the reaction of isostearyl alcohol with 2-ethylhexanoic acid[9]	skin cond. agent-emol.
Isostearyl Hydroxystearate 162888-05-3; 338450-67-2	the ester obtained from the reaction of isostearyl alcohol with hydroxystearic acid[9]	skin cond. agent-emol.

Table 4. Definitions and functions

Ingredient/CAS No.	Definition	Function[9]
Isostearyl Isostearate 41669-30-1	the ester obtained from the reaction of isostearyl alcohol with isostearic acid[9]	skin cond. agent-emol.; binder
Isostearyl Laurate	the ester obtained from the reaction of isostearyl alcohol with lauric acid	skin cond. agent-emol.
Isostearyl Linoleate 127358-80-9	the ester obtained from the reaction of isostearyl alcohol with linoleic acid[9]	skin cond. agent-emol.
Isostearyl Palmitate 69247-83-2; 72576-80-8	the ester obtained from the reaction of isostearyl alcohol with palmitic acid[9]	skin cond. agent-emol.; binder
Isotridecyl Laurate 94134-83-5	the ester obtained from the reaction of isotridecyl alcohol with lauric acid	skin cond. agent-oc.; hair cond. agent
Isotridecyl Stearate 31565-37-4	the monoester obtained from the reaction of isotridecyl alcohol with stearic acid[9]	skin cond. agent-emol.
Lauryl Behenate 42233-07-8	the ester obtained from the reaction of lauryl alcohol with behenic acid[9]	skin cond. agent-oc.
Lauryl Carpotroche Brasiliensis Seedate	the mixture of esters obtained from the reaction of lauryl alcohol with the fatty acids derived from Carpotroche Brasiliensis Seed Oil	skin cond. agent-emol.; skin bleaching agent
Lauryl Ethylhexanoate 56078-38-7	the ester obtained from the reaction of lauryl alcohol with 2-ethylhexanoic acid[9]	skin cond. agent-emol.
Lauryl Isostearate 93803-85-1	ester obtained from the reaction of lauryl alcohol with isostearic acid[9]	skin cond. agent-emol.
Lauryl Laurate 13945-76-1	the ester obtained from the reaction of lauryl alcohol with lauric acid[9]	skin cond. agent-misc.; binder; emul. stab.; hair cond. agent; opacifying agent
Lauryl Oleate 36078-10-1	the ester obtained from the reaction of lauryl alcohol with oleic acid[9]	skin cond. agent-oc.
Lauryl Palmitate 42232-29-1	the ester obtained from the reaction of lauryl alcohol with palmitic acid[9]	skin cond. agent-oc.
Lauryl Stearate 5303-25-3	the ester obtained from the reaction of lauryl alcohol with stearic acid[9]	skin cond. agent-oc.
Lauryl Theobroma Grandiflorum Seedate	the mixture of esters obtained from the reaction of lauryl alcohol with the fatty acids derived from Theobroma Grandiflorum Seed Butter	skin cond. agent-emol.; skin bleaching agent
Lignoceryl Erucate	the ester obtained from the reaction of lignoceryl alcohol with erucic acid[9]	skin cond. agent-emol.
Myristyl Carpotroche Brasiliensis Seedate	the mixture of esters obtained from the reaction of myristyl alcohol with the fatty acids dervied from Carpotroche Brasiliensis Seed Oil	skin cond. agent-emol.; skin bleaching agent
Myristyl Ethylhexanoate 72201-45-7	the ester obtained from the reaction of myristyl alcohol with 2-ethylhexanoic acid[9]	skin cond. agent-emol.
Myristyl Isostearate 94247-26-4	the ester obtained from the reaction of myristyl alcohol with isostearic acid[9]	skin cond. agent-emol.
Myristyl Laurate 22412-97-1	the ester obtained from the reaction of myristyl alcohol with lauric acid[9]	surf-emulsifying agent
Myristyl Neopentanoate 144610-93-5	the ester obtained from the reaction of myristyl alcohol with neopentanoic acid[9]	skin cond. agent-emol.
Myristyl Theobroma Grandiflorum Seedate	the ester obtained from the reaction of myristyl alcohol with the fatty acids obtained from Theobroma Grandiflorum Seed Butter	skin cond. agent-emol.; skin bleaching agent
Octyldecyl Oleate	the ester obtained from the reaction of 2-octyldecanol with oleic acid[9]	skin cond. agent-emol.
Octyldodecyl Avocadoate	the mixture of esters obtained from the reaction of 2-octyldodecanol with the fatty acids derived from avocado oil	skin cond. agent-emol.
Octyldodecyl Beeswax	the mixture of esters obtained from the reaction of 2-octyldodecanol with a mixture of straight-chain fatty acids, containing 24 to 36 carbons in alkyl chain length (beeswax acid)	skin cond. agent-emol.
Octyldodecyl Behenate 125804-08-2	the ester obtained from the reaction of 2-octyldodecanol with behenic acid[9]	skin cond. agent-oc.
Octyldodecyl Erucate 88103-59-7	the ester obtained from the reaction of 2-octyldodecanol with erucic acid[9]	skin cond. agent-oc.
Octyldodecyl Ethylhexanoate 69275-04-3	is the ester obtained from the reaction of 2-octyldodecanol and 2-ethylhexanoic acid[9]	skin cond. agent-emol.
Octyldodecyl Hydroxystearate 308122-33-0	ester obtained from the reaction of 2-octyldodecanol and 12-hydroxystearic acid[9]	skin cond. agent-oc.
Octyldodecyl Isostearate 93803-87-3	the ester obtained from the reaction of 2-octyldodecanol with isostearic acid[9]	skin cond. agent-oc.
Octyldodecyl Meadowfoamate	the ester obtained from the reaction of 2-octyldodecanol with the fatty acids derived from Limnanthes Alba (Meadowfoam) Seed Oil	skin cond. agent-oc.
Octyldodecyl Neodecanoate 1004272-41-6	the ester obtained from the reaction of 2-octyldodecanol with neodecanoic acid[9]	skin cond. agent-emol.
Octyldodecyl Neopentanoate 158567-66-9	the ester obtained from the reaction of 2-octyldodecanol with neopentanoic acid[9]	skin cond. agent-emol.
Octyldodecyl Octyldodecanoate	the ester obtained from the reaction of 2-octyldecanol with 2-octyldodecanoic acid[9]	skin cond. agent-oc.
Octyldodecyl Oleate 22801-45-2	the ester obtained from the reaction of 2-octyldodecanol with oleic acid[9]	skin cond. agent-oc.
Octyldodecyl Olivate 22801-45-2	the ester obtained from the reaction of 2-octyldodecanol with the fatty acids derived from Olea Europaea (Olive) Oil[9]	skin cond. agent-emol.; skin cond. agent-oc.; binder; film former; hair cond. agent; slip modifier

Table 4. Definitions and functions

Ingredient/CAS No.	Definition	Function[9]
Octyldodecyl Safflowerate	the ester obtained from the reaction of 2-octyldodecanol with the fatty acids derived from Carthamus Tinctorius (Safflower) Oil[9]	skin cond. agent-emol.
Octyldodecyl Stearate 22766-82-1	the ester of octyldodecanol and stearic acid[9]	skin cond. agent-oc.
Oleyl Arachidate 22393-96-0; 156952-79-3	the ester obtained from the reaction of oleyl alcohol with arachidic acid[9]	skin cond. agent-oc.
Oleyl Erucate 17673-56-2; 143485-69-2	the ester obtained from the reaction of oleyl alcohol with erucic acid[9]	skin cond. agent-oc.
Oleyl Linoleate 17673-59-5	the ester obtained from the reaction of oleyl alcohol with linoleic acid[9]	skin cond. agent-oc.; hair cond, agent
Oleyl Oleate 3687-45-4; 17363-94-9	the ester obtained from the reaction of oleyl alcohol with oleic acid[9]	skin cond. agent-emol.; skin cond. agent-emol.
Oleyl Stearate 33057-39-5; 17673-50-6	the ester obtained from the reaction of oleyl alcohol with stearic acid[9]	skin cond. agent-oc.; hair cond. agent
Propylheptyl Caprylate 868839-23-0	the ester obtained from the reaction of 2-propylheptanol with caprylic acid	skin cond. agent-emol.
Stearyl Beeswax 42233-11-4	the mixture of esters obtained from the reaction of stearyl alcohol with a mixture of straight-chain fatty acids, containing 24 to 36 carbons in alkyl chain length (beeswax acid)	skin cond. agent-oc.
Stearyl Erucate 86601-84-5; 96810-34-3	the ester obtained from the reaction of stearyl alcohol with erucic acid[9]	visc. incr. agent-nonaq.
Stearyl Ethylhexanoate 59130-70-0	the ester obtained from the reaction of stearyl alcohol with 2-ethylhexanoic acid[9]	skin cond. agent-oc.
Stearyl Linoleate 17673-53-9	the ester obtained from the reaction of stearyl alcohol with linoleic acid[9]	skin cond. agent-oc.; visc. incr. agent-nonaq.
Tetradecyleicosyl Stearate	is the ester obtained from the reaction of myristyleicosanol with stearic acid[9]	skin cond. agent-oc.
Tetradecyloctadecyl Behenate	the ester obtained from the reaction of tetradecyloctadecanol with behenic acid[9]	skin cond. agent-oc.; binder; emul. stab; film former; opacifying agent
Tetradecyloctadecyl Hexyldecanoate 93982-00-4	is the ester obtained from the reaction of 2-tetradecyloctyldecanol with 2-hexyldecanoic acid	skin cond. agent-emol.
Tetradecyloctadecyl Stearate	the ester obtained from the reaction of tetradecyloctadecanol with stearic acid[9]	skin cond. agent-oc.; binder; emul. stab; film former; opacifying agent
Tetradecylpropionates	an isomeric mixture of esters consisting chiefly of 2-tetradecylproprionate, 3-tetradecylproprionate, and 4-tetradecylproprionate[9]	skin cond. agent-emol.; solvent
Tridecyl Behenate 42233-08-9	the ester obtained from the reaction of tridecyl alcohol with behenic acid[9]	skin cond. agent-oc.
Tridecyl Erucate 131154-74-0; 221048-36-8	the ester obtained from the reaction of tridecyl alcohol with erucic acid[9]	skin cond. agent-oc.
Tridecyl Ethylhexanoate	the ester obtained from the reaction of tridecyl alcohol with 2-ethylhexanoic acid[9]	skin cond. agent-emol.
Tridecyl Laurate 36665-67-5	the ester obtained from the reaction of tridecyl alcohol with lauric acid[9]	skin cond. agent-oc.
Tridecyl Neopentanoate 106436-39-9; 105859-93-6	the ester obtained from the reaction of tridecyl alcohol with neopentanoic acid[9]	skin cond. agent-emol.
Tridecyl Stearate 31556-45-3	the ester obtained from the reaction of tridecyl alcohol with stearic acid[9]	skin cond. agent-emol.

Abbreviations: cond. – conditioning; disp. – dispersing; emol. – emollient; emul. – emulsion; incr. – increasing; ingr. – ingredient; misc. – miscellaneous; nonaq. – non-aqueous; nonsurf – non-surfactant; oc. – occlusive; solub. – solubilizing; stab. – stabilizer; surf. – surfactant; visc. – viscosity

Table 5. Methods of Manufacture

Ingredient	Method of Manufacture	Reference
Butyl Oleate	reaction of butanol and oleic acid in the presence of dihydrogen phosphate	57
	prepared from *n*-butanol and oleic acid by heating, with sulfuric acid as a catalyst	58,59
	esterification of oleic acid with butyl alcohol in *n*-hexane in the presence of the macroporous sulfonic resin K2411	60
	synthesized with *Candida antarctica* lipase catalyst or using a sodium alcoholate catalyst	8
	esterification of oleic acid with butanol in the presence of *p*-toluene sulfonic acid	61
	lipase-catalyzed oleic acid esterification by *n*-butyl alcohol in almost non-aqueous media without an organic solvent	62
Cetyl Behenate	esterification of behenic acid with cetyl alcohol using *n*-butyl benzene as the solvent and tetra *n*-butyl titanate as the catalyst	63
Cetyl Oleate	cetyl alcohol and oleic acid were dissolved in benzene and heated, using sulfuric acid as a catalyst; the mixture was then washed, the benzene filtered and removed by vacuum distillation, and the ester separated twice by distillation	18
	esterification of oleic acid with cetyl alcohol in *n*-hexane in the presence of *p*-toluene sulfonic acid	60
	lipase-catalyzed oleic acid esterification by cetyl alcohol in almost non-aqueous media without an organic solvent	62
Ethylhexyl Ethylhexanoate	direct esterification reaction of 2-ethylhexanoic acid and 2-ethylhexanol in *n*-hexane as solvent and Novozym 435 (a commercial immobilized lipase from Candida antartica) as catalyst	64
Ethylhexyl Laurate	co-produced by the lipase-catalyzed acylation of racemic alcohol and vinyl laurate in the production of (R)-2-ethylhexanol	65

Table 5. Methods of Manufacture

Ingredient	Method of Manufacture	Reference
Ethylhexyl Oleate	synthesized with *Candida antarctica* lipase catalyst or using a sodium alcoholate catalyst	8
Isopropyl Arachidate	arachidic acid was treated with with isopropyl alcohol in large molar excess, p-toluene sulfonic acid was the catalyst	66
Isopropyl Laurate	lauric acid was treated with with isopropyl alcohol in large molar excess, p-toluene sulfonic acid was the catalyst	66
Isopropyl Oleate	esterification of oleic acid with isopropyl alcohol in *n*-hexane in the presence of K2411	60
	synthesized with *Candida antarctica* lipase catalyst or using a sodium alcoholate catalyst	8
Lauryl Behenate	esterification of behenic acid with lauryl alcohol using *n*-butyl benzene as the solvent and tetra *n*-butyl titanate as the catalyst	63
Lauryl Oleate	esterification of oleic acid with lauryl alcohol in *n*-hexane in the presence of *p*-toluene sulfonic acid	60
	synthesized with *Candida antarctica* lipase catalyst or using a sodium alcoholate catalyst	
Lauryl Palmitate	lipase-catalyzed esterification of palmitic acid and lauryl alcohol using Novozym 435 as the biocatalyst	67
Myristyl Laurate	the fatty acid chloride was reacted with myristic acid in the presence of pyridine, using diethyl ether as the solvent	68
Oleyl Arachidate	the fatty acid chloride was reacted with oleic acid in the presence of pyridine, using diethyl ether as the solvent	68
Oleyl Oleate	the fatty acid chloride was reacted with oleic acid in the presence of pyridine, using diethyl ether as the solvent	68
	lipase-catalyzed oleic acid esterification by oleyl alcohol in almost non-aqueous media without an organic solvent	62
	synthesized with *Candida antarctica* lipase catalyst or using a sodium alcoholate catalyst	8
Oleyl Stearate	the fatty acid chloride was reacted with oleic acid in the presence of pyridine, using diethyl ether as the solvent	68

Table 6. Chemical and physical properties

Property	Description	Reference
	Cetyl Esters	
characteristics	white to off-white, somewhat translucent solid with a crystalline structure and a faint odor	69
melting range	43-47°C	69
specific gravity	0.820-0.840 (50°C)	69
saponification value	109 - 120	69
solubility	soluble in boiling alcohol, ether, chloroform, and fixed oils	69
	insoluble in water and cold alcohol	
composition	mixture consisting of esters of primarily saturated fatty alcohols (C_{14} to C_{18}) and saturated fatty acids (C_{14} to C_{18})	69
	Arachidyl Behenate	
molecular weight	621.12	70
boiling point	648.7°C (760 Torr) (calculated)	70
density	0.856 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	20.146 (25°C) (calculated)	70
	Arachidyl Erucate	
molecular weight	619.10	70
boiling point	608.3°C (760 Torr) (calculated)	70
density	0.898 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	16.353 (25°C) (calculated)	70
	Batyl Stearate	
molecular weight	611.03	70
boiling point	656.9°C (760 Torr) (calculated)	70
density	0.856 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	20.146 (25°C) (calculated)	70
pKa	14.08 (most acidic temperature: 25°C) (calculated)	70
	Behenyl Behenate	
molecular weight	649.18	71
	Behenyl Erucate	
molecular weight	647.15	70
boiling point	669.1°C (760 Torr) (calculated)	70
density	0.860 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	20.755 (25°C) (calculated)	70
	Butyl Oleate	
appearance and form	mobile, yellow, oily liquid	
molecular weight	338.57	57
melting point	-31.7°C	8
	-35.5°C	61
boiling point	235-45 °C	57
density	0.870 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	9.547 (25°C) (calculated)	70
	Caprylyl Butyrate	
molecular weight	200.32	70,71
melting point	-55.6°C	72
boiling point	244.1°C	72
water solubility	5.81 mg/l (25°C) (estimated)	72
density	0.870 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	4.861 (25°C) (calculated)	70

Table 6. Chemical and physical properties

Property	Description	Reference
	Caprylyl Caprylate	
molecular weight	256.42	70,71
melting point	-18.1°C	72
boiling point	306.8°C	72
water solubility	0.112 mg/l (25°C) (estimated)	72
density	0.865 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	6.899 (25°C) (calculated)	70
	Cetyl Behenate	
molecular weight	565.01	70
melting point	65°C	63
boiling point	569.4°C (760 Torr) (calculated)	70
density	0.857 g/cm^3 (20°C; 760 Torr) (calculated)	70
specific gravity	0.8178 – 0.804 (70 - 100°C, respectively)	63
refractive index	1.441 – 1.433 (70 - 90°C, respectively)	63
log P	18.108 (25°C) (calculated)	70
	Cetyl Caprylate	
form	liquid	20
molecular weight	368.64	70,71
boiling point	414.2°C (760 Torr) (calculated)	70
density	0.860 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	10.975 (25°C) (calculated)	70
	Cetyl Ethylhexanoate	
form	liquid	20
molecular weight	368.64	70,71
boiling point	407.2°C (760 Torr) (calculated)	70
density	0.859 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	10.819 (25°C) (calculated)	70
	Cetyl Laurate	
molecular weight	424.74	70
melting point	40-41°C	73
boiling point	462.2°C (760 Torr) (calculated)	70
density	0.860 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	113.013 (25°C) (calculated)	70
	Cetyl Oleate	
molecular weight	506.89	71
melting point	25.5°C	74
saponification value	110.7	18
	C32-36 Isoalkyl Stearate	
molecular weight	761.38	71
	Decyl Laurate	
molecular weight	340.58	71
boiling point	388.9°C (760 Torr) (calculated)	70
log P	9.956 (25°C) (calculated)	70
	Decyl Palmitate	
molecular weight	396.69	70,71
melting point	30°C	75
boiling point	438.7°C (760 Torr) (calculated)	70
density	0.860 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	11.994 (25°C) (calculated)	70
	Ethylhexyl Ethylhexanoate	
molecular weight	256.42	70
boiling point	288.3°C (760 Torr) (calculated)	70
density	0.863 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	6.587 (25°C) (calculated)	70
	Ethylhexyl Hydroxystearate	
characteristics	clear to slightly opalescent, yellow, oily liquid with a slight fatty odor	69
boiling point	490.6°C (760 Torr) (calculated)	70
specific gravity	0.889-0.895 (25°/25°C)	69
saponification value	140-160	69
solubility	soluble in ethyl alcohol and corn oil insoluble in water and propylene glycol	69
log P	9.776 (25°C) (calculated)	70
	Ethylhexyl Isopalmitate	
form	liquid	20
	Ethylhexyl Laurate	
molecular weight	312.53	70,71
melting point	-30°C	24
boiling point	>250°C (1013 hPa) 124-126°C (0.1 mm Hg)	24 65
water solubility	1 mg/l (20°C)	24
density	0.86 g/cm^3 (20°C)	24
log P	8.781 (25°C) (calculated)	70

Table 6. Chemical and physical properties

Property	Description	Reference
	Ethylhexyl Oleate	
molecular weight	394.67	70
melting point	-2.9°C	8
boiling point	465.8°C (760 Torr) (calculated)	70
density	0.867 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	11.429 (25°C) (calculated)	70
	Erucyl Erucate	
molecular weight	645.14	70
boiling point	668.1°C (760 Torr) (calculated)	70
density	0.865 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	20.346 (25°C) (calculated)	70
	Erucyl Oleate	
molecular weight	589.03	70
boiling point	631.3	70
density	0.866 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	18.308 (25°C) (calculated)	70
	Heptyl Undecylenate	
molecular weight	282.46	70,71
boiling point	351.0°C (760 Torr) (calculated)	70
density	0.871 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	7.510 (25°C) (calculated)	70
	Heptylundecyl Hydroxystearate	
molecular weight	552.96	70
boiling point	607.3°C (760 Torr) (calculated)	70
density	0.885 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	14.870 (25°C) (calculated)	70
pKa	15.40 (most acidic temp: 25°C)	70
	Hexyldecyl Laurate	
molecular weight	424.74	71
	Hexyldecyl Oleate	
molecular weight	506.89	70,71
boiling point	563.6°C (760 Torr) (calculated)	70
density	0.863 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	15.505 (25°C) (calculated)	70
	Hexyldecyl Palmitate	
molecular weight	480.85	71
	Hexyl Laurate	
molecular weight	284.48	70,71
melting point	-3.4°C	76
boiling point	130°C	76
density	0.864 g/cm^3 (20°C; 760 Torr) (calculated)	70
refractive index	1.4382	76
log P	7.918 (25°C) (calculated)	70
	Hydroxyoctacosanyl Hydroxystearate	
molecular weight	709.22	70,71
boiling point	311.8°C (760 Torr) (calculated)	70
density	0.864 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	7.253 (25°C) (calculated)	70
	Isoamyl Laurate	
molecular weight	270.45	70,71
boiling point	631.3	70
density	0.866 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	18.308 (25°C) (calculated)	70
	Isobutyl Palmitate	
molecular weight	312.53	70,71
boiling point	354.6°C (760 Torr) (calculated)	70
density	0.862 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	8.781 (25°C) (calculated)	70
	Isocetyl Ethylhexanoate	
form	liquid	20
	Isocetyl Isostearate	
form	liquid	20
molecular weight	508.9	71
	Isocetyl Palmitate	
form	liquid	20
	Isocetyl Stearate	
form	liquid	20
	Isodecyl Laurate	
form	colorless or pale yellow liquid	26
molecular weight	340.58	70
boiling point	374.2°C (760 Torr) (calculated)	70
density	0.860 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	9.644 (25°C) (calculated)	70

Table 6. Chemical and physical properties

Property	Description	Reference
	Isodecyl Neopentanoate	
molecular weight	242.40	71
	Isodecyl Palmitate	
molecular weight	396.69	70,71
boiling point	425.2°C (760 Torr) (calculated)	70
density	0.858 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	11.682 (25°C) (calculated)	70
	Isodecyl Stearate	
molecular weight	424.74	71
	Isohexyl Caprate	
molecular weight	256.42	70
boiling point	296.8°C (760 Torr) (calculated)	70
density	0.864 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	6.743 (25°C) (calculated)	70
	Isohexyl Laurate	
characteristics	pale yellow liquid with a coconut-like odor	69
molecular weight	284.48	70
boiling point	326.5°C (760 Torr) (calculated)	70
refractive index	1.439 - 1.442 (20°C)	69
specific gravity	0.843 -0.853 (25°/25°C)	69
saponification value	130 - 145	69
solubility	soluble in most organic solvents insoluble in water	69
free fatty acid content	0.1% (max.) (as lauric acid)	69
log P	7.762 (25°C) (calculated)	70
	Isohexyl Neopentanoate	
molecular weight	186.29	70
boiling point	193.2°C (760 Torr) (calculated)	70
density	0.870 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	3.941 (25°C) (calculated)	70
	Isohexyl Palmitate	
characteristics	light yellow liquid with a fatty-type odor	69
molecular weight	340.58	70
boiling point	381.5°C (760 Torr) (calculated)	70
refractive index	1.4433 - 1.4443 (20°C)	69
specific gravity	0.850 -0.860 (25°/25°C)	69
saponification value	165-171	69
solubility	soluble in alcohol and mineral oil insoluble in water and lower glycols and glycerin	69
log P	9.800 (25°C) (calculated)	70
	Isopropyl Arachidate	
form	white crystal	66
molecular weight	354.61	70
melting point	53-55°C	66
boiling point	394.4°C (760 Torr) (calculated)	70
density	0.860 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	10.310 (25°C) (calculated)	70
	Isopropyl Behenate	
molecular weight	382.66	70
boiling point	419.6°C (760 Torr) (calculated)	70
density	0.859 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	11.329 (25°C) (calculated)	70
	Isopropyl Laurate	
form	yellow oil	66
molecular weight	242.40	70
boiling point	196°C	72
density	0.865 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	6.234 (25°C) (calculated)	70
	Isopropyl Linoleate	
molecular weight	322.53	70
boiling point	399.0°C (760 Torr) (calculated)	70
density	0.880 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	8.478 (25°C) (calculated)	70
	Isopropyl Oleate	
molecular weight	324.54	71
melting point	-33.4°C	8
boiling point	369.8°C (760 Torr) (calculated)	70
density	0.870 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	8.881 (25°C) (calculated)	70
	Isopropyl Sorbate	
molecular weight	154.21	70
boiling point	200.0°C (760 Torr) (calculated)	70
density	0.916 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	2.770 (25°C) (calculated)	70

Table 6. Chemical and physical properties

Property	Description	Reference
	Isostearyl Ethylhexanoate	
form	liquid	20
	Isostearyl Hydroxystearate	
molecular weight	552.96	70
boiling point	607.3°C (760 Torr) (calculated)	70
density	0.885 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	14.870 (25°C) (calculated)	70
	Isostearyl Isostearate	
molecular weight	536.96	71
log P	17.399 (calculated)	22
	Isotridecyl Laurate	
molecular weight	382.66	70
boiling point	419.6°C (760 Torr) (calculated)	70
density	0.859 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	11.329 (25°C) (calculated)	70
	Isotridecyl Stearate	
molecular weight	466.82	71
	Lauryl Behenate	
molecular weight	508.90	70
melting point	53°C	63
boiling point	528.4°C (760 Torr) (calculated)	70
specific gravity	0.8295 – 0.8137 (60 - 90°C, respectively)	63
refractive index	1.443 – 1.433 (60 - 80°C, respectively)	63
log P	16.070 (25°C) (calculated)	70
	Lauryl Ethylhexanoate	
molecular weight	312.53	70
boiling point	354.6°C (760 Torr) (calculated)	70
density	0.862 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	8.781 (25°C) (calculated)	70
	Lauryl Laurate	
molecular weight	368.64	70
melting point	27°C	77
boiling point	226°C	77
density	0.860 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	10.975 (25°C) (calculated)	70
	Lauryl Oleate	
molecular weight	485.75	70
melting point	14.5°C	78
	18.4°C	8
boiling point	519.6°C (760 Torr) (calculated)	70
density	0.865g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	13.623 (25°C) (calculated)	70
	Lauryl Palmitate	
molecular weight	424.74	70
boiling point	462.2°C (760 Torr) (calculated)	70
density	0.859 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	13.013 (25°C) (calculated)	70
	Lauryl Stearate	
molecular weight	452.08	70
boiling point	484.9°C (760 Torr) (calculated)	70
density	0.858 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	14.032 (25°C) (calculated)	70
	Myristyl Ethylhexanoate	
molecular weight	340.58	70
boiling point	381.5°C (760 Torr) (calculated)	70
density	0.861 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	9.800 (25°C) (calculated)	70
	Myristyl Laurate	
molecular weight	396.69	70
boiling point	438.7°C (760 Torr) (calculated)	70
density	0.860 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	11.994 (25°C) (calculated)	70
	Myristyl Neopentanoate	
molecular weight	298.50	70
boiling point	332.3°C (760 Torr) (calculated)	70
density	0.863 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	8.173 (25°C) (calculated)	70
	Myristyl Laurate	
melting point	40-40.4°C	68
	Octyldodecyl Behenate	
molecular weight	621.12	70
boiling point	603.0°C (760 Torr) (calculated)	70
density	0.855 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	19.990 (25°C) (calculated)	70

Table 6. Chemical and physical properties

Property	Description	Reference
	Octyldedecyl Erucate	
molecular weight	619.10	70
boiling point	646.0°C (760 Torr) (calculated)	70
density	0.860 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	19.581 (25°C) (calculated)	70
	Octyldodecyl Ethylhexanoate	
molecular weight	424.74	70
boiling point	449.2°C (760 Torr) (calculated)	70
density	0.858 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	12.701 (25°C) (calculated)	70
	Octyldodecyl Neopentanoate	
molecular weight	382.66	70
boiling point	405.6°C (760 Torr) (calculated)	70
density	0.859 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	11.074 (25°C) (calculated)	70
	Octyldodecyl Oleate	
molecular weight	562.99	70
boiling point	608.2°C (760 Torr) (calculated)	70
density	0.861 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	17.543 (25°C) (calculated)	70
	Octyldodecyl Stearate	
molecular weight	565.01	70
boiling point	563.8°C (760 Torr) (calculated)	70
density	0.856 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	17.952 (25°C) (calculated)	70
	Oleyl Arachidate	
molecular weight	562.99	70
melting point	39.5-40°C	68
boiling point	617.5°C (760 Torr) (calculated)	70
density	0.862 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	17.699 (25°C) (calculated)	70
	Oleyl Erucate	
molecular weight	589.03	70
boiling point	637.7°C (760 Torr) (calculated)	70
density	0.866 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	18.308 (25°C) (calculated)	70
	Oleyl Linoleate	
molecular weight	530.91	70
boiling point	595.5°C (760 Torr) (calculated)	70
density	0.874 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	15.867 (25°C) (calculated)	70
	Oleyl Oleate	
molecular weight	532.92	70
melting point	-4.0 to -3.5°C	68
	-1.5°C	8
boiling point	596.5°C (760 Torr) (calculated)	70
density	0.868 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	16.270 (25°C) (calculated)	70
	Oleyl Stearate	
molecular weight	534.94	70
melting point	34.0-34.5°C	68
boiling point	595.8°C (760 Torr) (calculated)	70
density	0.862 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	16.680 (25°C) (calculated)	70
	Propylheptyl Caprylate	
molecular weight	284.48	70
purity	>80%	25
melting point	-38.9°C	25
boiling point	319.0°C (101.3 kPa)	25
waer solubility	<0.01 mg/l (20°C)	25
density	0.863 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	7.963 (25°C) (calculated)	70
	Stearyl Erucate	
molecular weight	591.05	70
boiling point	627.8°C (760 Torr) (calculated)	70
density	0.861 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	18.718 (25°C) (calculated)	70
	Stearyl Ethylhexanoate	
form	liquid	20
molecular weight	396.69	70
boiling point	431.9°C (760 Torr) (calculated)	70
density	0.859 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	11.838 (25°C) (calculated)	70

Table 6. Chemical and physical properties

Property	Description	Reference
	Stearyl Linoleate	
molecular weight	532.92	70
boiling point	590.8°C (760 Torr) (calculated)	70
density	0.868 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	16.276 (25°C) (calculated)	70
	Tetradecyloctadecyl Hexyldecanoate	
molecular weight	705.27	70
boiling point	653.7°C (760 Torr) (calculated)	70
density	0.854 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	22.891 (25°C) (calculated)	70
	Tridecyl Behenate	
molecular weight	522.93	70
boiling point	538.8°C (760 Torr) (calculated)	70
density	0.857 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	16.579 (25°C) (calculated)	70
	Tridecyl Erucate	
molecular weight	520.91	70
boiling point	573.1°C (760 Torr) (calculated)	70
density	0.863 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	16.170 (25°C) (calculated)	70
	Tridecyl Laurate	
molecular weight	382.66	70
boiling point	426.6°C (760 Torr) (calculated)	70
density	0.860 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	11.485 (25°C) (calculated)	70
	Tridecyl Stearate	
molecular weight	466.82	70
boiling point	496.0°C (760 Torr) (calculated)	70
density	0.858 g/cm^3 (20°C; 760 Torr) (calculated)	70
log P	14.541 (25°C) (calculated)	70

Table 7a. Frequency and concentration of use according to duration and type of exposure

	# of Uses[10]	*Max Conc of Use (%)***	*# of Uses*[10]	*Max Conc of Use (%)***	*# of Uses*[10]	*Max Conc of Use (%)***
	Cetyl Esters		**Arachidyl Behenate**		**Behenyl Beeswax**	
Totals*	**451**		**20**		**1**	
Duration of Use						
Leave-On	*235*		*20*		*1*	
Rinse-Off	*216*		*NR*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	29		5		1	
Incidental Ingestion	7		2		NR	
Incidental Inhalation-Spray	16[a]		NR		NR	
Incidental Inhalation-Powder	1		NR		NR	
Dermal Contact	180		18		NR	
Deodorant (underarm)	1[b]		NR		NR	
Hair - Non-Coloring	259		NR		NR	
Hair-Coloring	5		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	10		2		NR	
Baby Products	1		NR		NR	
	Behenyl Behenate		**Behenyl Erucate**		**Butyl Avocadate**	
Totals*	**3**		**8**		**8**	
Duration of Use						
Leave-On	*3*		*8*		*5*	
Rinse Off	*NR*		*NR*		*3*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	1		NR		NR	
Incidental Ingestion	NR		8		NR	
Incidental Inhalation-Spray	NR		NR		1[a]	
Incidental Inhalation-Powder	NR		NR		NR	
Dermal Contact	3		NR		6	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		NR		2	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	NR		8		NR	
Baby Products	NR		NR			
	C12-13 Alkyl Ethylhexanoate		**C12-15 Alkyl Ethylhexanoate**		**C20-40 Alkyl Stearate**	
Totals*	**10**		**42**		**11**	
Duration of Use						
Leave-On	*10*		*42*		*11*	
Rinse-Off	*NR*		*NR*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	5		2		NR	
Incidental Ingestion	2		NR		8	
Incidental Inhalation-Spray	NR		2		NR	
Incidental Inhalation-Powder	NR		NR		NR	
Dermal Contact	8		42		NR	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		NR		3	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	2		NR		2	
Baby Products	NR		NR		NR	
	Caprylyl Caprylate		**Caprylyl Eicosenoate**		**Cetearyl Behenate**	
Totals	**5**		**1**		**2**	
Duration of Use						
Leave-On	*5*		*1*		*2*	
Rinse Off	*NR*		*NR*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	NR		NR		2	
Incidental Ingestion	NR		NR		NR	
Incidental Inhalation-Spray	NR		NR		NR	
Incidental Inhalation-Powder	NR		NR		NR	
Dermal Contact	5		1		2	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		NR		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	NR		NR		NR	
Baby Products	NR		NR		NR	

Table 7a. Frequency and concentration of use according to duration and type of exposure

	# of Uses[10]	*Max Conc of Use (%)***	*# of Uses*[10]	*Max Conc of Use (%)***	*# of Uses*[10]	*Max Conc of Use (%)***
	Cetearyl Candelillate		**Cetearyl Olivate**		**Cetearyl Stearate**	
Totals*	**2**		**111**		**3**	
Duration of Use						
Leave-On	*2*		*86*		*3*	
Rinse-Off	*NR*		*25*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	NR		12		NR	
Incidental Ingestion	1		NR		NR	
Incidental Inhalation-Spray	1[a]		2[a]		NR	
Incidental Inhalation-Powder	NR		1		NR	
Dermal Contact	1		107		3	
Deodorant (underarm)	NR		1[b]		NR	
Hair - Non-Coloring	NR		3		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	1		2		NR	
Baby Products	NR		1		NR	
	Cetyl Caprylate		**Cetyl Ethylhexanoate**		**Cetyl Laurate**	
Totals*	**20**		**294**		**1**	
Duration of Use						
Leave-On	*18*		*214*		*1*	
Rinse-Off	*2*		*80*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	2		53		NR	
Incidental Ingestion	NR		15		NR	
Incidental Inhalation-Spray	NR		8[a]		NR	
Incidental Inhalation-Powder	NR		5		NR	
Dermal Contact	20		236		1	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		57		NR	
Hair-Coloring	NR		1		NR	
Nail	NR		NR		NR	
Mucous Membrane	NR		15		NR	
Baby Products	NR		NR		NR	
	Cetyl Tallowate		**Coco-Caprylate/Caprate**		**Ethylhexyl Ethylhexanoate**	
Totals	**1**		**185**		**20**	
Duration of Use						
Leave-On	*1*		*159*		*20*	
Rinse Off	*NR*		*20*		*NR*	
Diluted for (Bath) Use	*NR*		*6*		*NR*	
Exposure Type						
Eye Area	NR		18		NR	
Incidental Ingestion	NR		2		NR	
Incidental Inhalation-Spray	NR		12[a]		NR	
Incidental Inhalation-Powder	NR		NR		NR	
Dermal Contact	1		182		20	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		1		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	NR		8		NR	
Baby Products	NR		NR		NR	
	Ethylhexyl Hydroxystearate		**Ethylhexyl Isopalmitate**		**Ethylhexyl Isostearate**	
Totals*	**229**		**6**		**6**	
Duration of Use						
Leave-On	*206*		*6*		*6*	
Rinse-Off	*23*		*NR*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	14		1		6	
Incidental Ingestion	73		NR		NR	
Incidental Inhalation-Spray	7[a]		1[a]		NR	
Incidental Inhalation-Powder	1		NR		NR	
Dermal Contact	225		6		1	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	4		NR		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	84		NR		NR	
Baby Products	NR		NR		NR	

Table 7a. Frequency and concentration of use according to duration and type of exposure

	# of Uses[10]	*Max Conc of Use (%)***	*# of Uses*[10]	*Max Conc of Use (%)***	*# of Uses*[10]	*Max Conc of Use (%)***
	Ethylhexyl Laurate		**Ethylhexyl Olivate**		**Heptylundecyl Hydroxystearate**	
Totals*	**1**		**2**		**19**	
Duration of Use						
Leave-On	*1*		*2*		*19*	
Rinse-Off	*NR*		*NR*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	NR		1		8	
Incidental Ingestion	NR		NR		6	
Incidental Inhalation-Spray	NR		NR		NR	
Incidental Inhalation-Powder	NR		NR		NR	
Dermal Contact	1		2		113	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		NR		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	NR		NR		6	
Baby Products	NR		NR		NR	
	Hexyl Laurate		**Hexyldecyl Laurate**		**Hexyldecyl Stearate**	
Totals	**166**		**29**		**29**	
Duration of Use						
Leave-On	*164*		*24*		*22*	
Rinse Off	*2*		*5*		*7*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	14		2		2	
Incidental Ingestion	13		NR		NR	
Incidental Inhalation-Spray	13[a]		NR		NR	
Incidental Inhalation-Powder	3		NR		NR	
Dermal Contact	147		25		29	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	2		4		NR	
Hair-Coloring	NR		NR		NR	
Nail	1		NR		NR	
Mucous Membrane	13		NR		NR	
Baby Products	3		NR		NR	
	Hydrogenated Ethylhexyl Olivate		**Hydroxyoctacosanyl Hydroxystearate**		**Isocetyl Ethylhexanoate**	
Totals*	**5**		**5**		**8**	
Duration of Use						
Leave-On	*5*		*5*		*NR*	
Rinse-Off	*NR*		*NR*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	1		1		1	
Incidental Ingestion	NR		NR		1	
Incidental Inhalation-Spray	NR		NR		NR	
Incidental Inhalation-Powder	NR		NR		NR	
Dermal Contact	5		5		7	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		NR		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	NR		NR		1	
Baby Products	NR		NR		NR	
	Isocetyl Palmitate		**Isodecyl Laurate**		**Isodecyl Neopentanoate**	
Totals	**5**		**1**		**117**	
Duration of Use						
Leave-On	*5*		*NR*		*113*	
Rinse Off	*NR*		*1*		*4*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	NR		1		22	
Incidental Ingestion	NR		NR		8	
Incidental Inhalation-Spray	NR		NR		7[a]	
Incidental Inhalation-Powder	NR		NR		4	
Dermal Contact	5		1		108	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		NR		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	NR		NR		8	
Baby Products	NR		NR		NR	

Table 7a. Frequency and concentration of use according to duration and type of exposure

	# of Uses[10]	Max Conc of Use (%)**	# of Uses[10]	Max Conc of Use (%)**	# of Uses[10]	Max Conc of Use (%)**
	Isohexyl Caprate		**Isopropyl Jojobate**		**Isopropyl Laurate**	
Totals*	**3**		**20**		**2**	
Duration of Use						
Leave-On	*3*		*20*		*2*	
Rinse-Off	*NR*		*NR*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	NR		2		NR	
Incidental Ingestion	NR		NR		NR	
Incidental Inhalation-Spray	NR		NR		2	
Incidental Inhalation-Powder	NR		NR		NR	
Dermal Contact	3		17		2	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		NR		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	NR		3		NR	
Baby Products	NR		NR		NR	
	Isostearyl Avocadate		**Isostearyl Behenate**		**Isostearyl Hydroxystearate**	
Totals*	**1**		**7**		**18**	
Duration of Use						
Leave-On	*1*		*7*		*18*	
Rinse-Off	*NR*		*NR*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	NR		NR		6	
Incidental Ingestion	NR		NR		NR	
Incidental Inhalation-Spray	NR		NR		NR	
Incidental Inhalation-Powder	NR		NR		3	
Dermal Contact	1		7		13	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		NR		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	NR		NR		5	
Baby Products	NR		NR		NR	
	Isostearyl Isostearate		**Isostearyl Linoleate**		**Isostearyl Palmitate**	
Totals	**184**		**2**		**59**	
Duration of Use						
Leave-On	*177*		*2*		*52*	
Rinse Off	*6*		*NR*		*7*	
Diluted for (Bath) Use	*1*		*NR*		*NR*	
Exposure Type						
Eye Area	4		NR		7	
Incidental Ingestion	109		NR		3	
Incidental Inhalation-Spray	1		NR		8[a]	
Incidental Inhalation-Powder	NR		1		8	
Dermal Contact	75		2		50	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		NR		6	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	110		NR		3	
Baby Products	NR		NR		NR	
	Isotridecyl Stearate		**Lauryl Laurate**		**Lauryl Palmitate**	
Totals*	**1**		**21**		**2**	
Duration of Use						
Leave-On	*1*		*21*		*1*	
Rinse-Off	*NR*		*NR*		*1*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	1		1		NR	
Incidental Ingestion	NR		1		NR	
Incidental Inhalation-Spray	NR		3		NR	
Incidental Inhalation-Powder	NR		NR		NR	
Dermal Contact	1		18		1	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		1		1	
Hair-Coloring	NR		NR		NR	
Nail	NR		1		NR	
Mucous Membrane	NR		1		NR	
Baby Products	NR		NR		NR	

Table 7a. Frequency and concentration of use according to duration and type of exposure

	# of Uses[10]	*Max Conc of Use (%)***	*# of Uses*[10]	*Max Conc of Use (%)***	*# of Uses*[10]	*Max Conc of Use (%)***
	Myristyl Laurate		**Octyldodecyl Erucate**		**Octyldodecyl Isostearate**	
Totals*	**8**		**1**		**1**	
Duration of Use						
Leave-On	*7*		*1*		*1*	
Rinse-Off	*1*		*NR*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	1		NR		NR	
Incidental Ingestion	1		NR		1	
Incidental Inhalation-Spray	NR		NR		NR	
Incidental Inhalation-Powder	NR		NR		NR	
Dermal Contact	7		1		NR	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		NR		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	1		NR		1	
Baby Products	NR		NR		NR	
	Octyldodecyl Neopentanoate		**Octyldodecyl Olivate**		**Octyldodecyl Stearate**	
Totals	**103**		**9**		**27**	
Duration of Use						
Leave-On	*83*		*9*		*27*	
Rinse Off	*20*		*NR*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	20		1		21	
Incidental Ingestion	18		NR		NR	
Incidental Inhalation-Spray	6[a]		NR		NR	
Incidental Inhalation-Powder	1		NR		NR	
Dermal Contact	76		9		25	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	9		NR		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	18		NR		2	
Baby Products	NR		NR		NR	
	Oleyl Erucate		**Oleyl Oleate**		**Propylheptyl Caprylate**	
Totals*	**33**		**11**		**13**	
Duration of Use						
Leave-On	*29*		*10*		*12*	
Rinse-Off	*4*		*1*		*1*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	1		3		NR	
Incidental Ingestion	6		4		5	
Incidental Inhalation-Spray	8[a]		NR		NR	
Incidental Inhalation-Powder	NR		3		NR	
Dermal Contact	26		7		7	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	1		NR		1	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	7		4		5	
Baby Products	NR		NR		NR	
	Stearyl Beeswax		**Stearyl Ethylhexanoate**		**Tetradecyloctadecyl Stearate**	
Totals*	**10**		**5**		**1**	
Duration of Use						
Leave-On	*9*		*5*		*1*	
Rinse-Off	*1*		*NR*		*NR*	
Diluted for (Bath) Use	*NR*		*NR*		*NR*	
Exposure Type						
Eye Area	NR		NR		NR	
Incidental Ingestion	NR		NR		NR	
Incidental Inhalation-Spray	NR		NR		NR	
Incidental Inhalation-Powder	NR		NR		NR	
Dermal Contact	10		3		1	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		2		NR	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	NR		NR		NR	
Baby Products	NR		NR		NR	

Table 7a. Frequency and concentration of use according to duration and type of exposure

	# of Uses[10]	Max Conc of Use (%)**	# of Uses[10]	Max Conc of Use (%)**	# of Uses[10]	Max Conc of Use (%)**
	Tridecyl Ethylhexanoate		**Tridecyl Neopentanoate**		**Tridecyl Stearate**	
Totals	**4**		**16**		**78**	
Duration of Use						
Leave-On	*4*		*15*		*63*	
Rinse Off	*NR*		*1*		*14*	
Diluted for (Bath) Use	*NR*		*NR*		*1*	
Exposure Type						
Eye Area	NR		10		NR	
Incidental Ingestion	NR		2		10	
Incidental Inhalation-Spray	1		NR		2[a]	
Incidental Inhalation-Powder	1		NR		1	
Dermal Contact	4		14		62	
Deodorant (underarm)	NR		NR		NR	
Hair - Non-Coloring	NR		NR		6	
Hair-Coloring	NR		NR		NR	
Nail	NR		NR		NR	
Mucous Membrane	NR		2		11	
Baby Products	NR		NR		1	

*Because each ingredient may be used in cosmetics with multiple exposure types, the sum of all exposure types may not equal the sum of total uses.

**Concentration of used data will be added once the Council survey is completes

[a]Includes suntan products, in that it is now known whether or not the reported product is a spray.

[b]It is not known whether or not the product is a spray.

NR – no reported uses

Table 7b. Ingredients not reported to be used

Arachidyl Erucate	Decyl Palmitate	Isopropyl Behenate
Batyl Isostearate	Decyltetradecyl Cetearate	Isopropyl Hydroxystearate
Batyl Stearate	Decyltetradecyl Ethylhexanoate	Isopropyl Linoleate
Behenyl Isostearate	Ethylhexyl Adipate/Palmitate/Stearate	Isopropyl Oleate
Behenyl/Isostearyl Beeswax	Ethylhexyl C10-40 Isoalkyl Acidate	Isopropyl Sorbate
Behenyl Olivate	Ethylhexyl Neopentanoate	Isopropyl Tallowate
Butyl Babassuate	Ethylhexyl Oleate	Isostearyl Erucate
Butyl Isostearate	Erucyl Arachidate	Isostearyl Ethylhexanoate
Butyl Oleate	Erucyl Erucate	Isostearyl Laurate
Butyloctyl Beeswax	Erucyl Oleate	Isotridecyl Laurate
Butyloctyl Behenate	Heptyl Undecylenate	Lauryl Behenate
Butyloctyl Candelillate	Hexyldecyl Ester of Hydrolyzed Collagen	Lauryl Carpotroche Brasiliensis Seedate
Butyloctyl Cetearate	Hexyldecyl Ethylhexanoate	Lauryl Ethylhexanoate
Butyloctyl Oleate	Hexyldecyl Hexyldecanoate	Lauryl Isostearate
Butyloctyl Palmitate	Hexyldecyl Isostearate	Lauryl Oleate
C14-30 Alkyl Beeswax	Hexyldecyl Oleate	Lauryl Stearate
C18-38 Alkyl Beeswax	Hexyldecyl Palmitate	Lauryl Theobroma Grandiflorum Seedate
C30-50 Alkyl Beeswax	Hexyldodecyl/Octyldecyl Hydroxystearate	Lignoceryl Erucate
C20-40 Alkyl Behenate	Hexyl Isostearate	Myristyl Carpotroche Brasiliensis Seedate
C18-38 Alkyl C24-54 Acid Ester	Hydrogenated Castor Oil Behenyl Esters	Myristyl Ethylhexanoate
C14-18 Alkyl Ethylhexanoate	Hydrogenated Castor Oil Cetyl Esters	Myristyl Isostearate
C16-36 Alkyl Stearate	Hydrogenated Castor Oil Stearyl Esters	Myristyl Neopentanoate
C30-50 Alkyl Stearate	Hydrogenated Ethylhexyl Sesamate	Myristyl Theobroma Grandiflorum Seedate
C40-60 Alkyl Stearate	Hydrogenated Isocetyl Olivate	Octyldecyl Oleate
Caprylyl Butyrate	Hydrogenated Isopropyl Jojobate	Octyldodecyl Avocadoate
Cetearyl Palmate	Hydroxycetyl Isostearate	Octyldodecyl Beeswax
Cetearyl Palmitate	Isoamyl Laurate	Octyldodecyl Behenate
Cetearyl Rice Branate	Isobutyl Palmitate	Octyldodecyl Ethylhexanoate
Cetyl Babassuate	Isobutyl Tallowate	Octyldodecyl Hydroxystearate
Cetyl Behenate	Isocetyl Behenate	Octyldodecyl Meadowfoamate
Cetyl Caprate	Isocetyl Isodecanoate	Octyldodecyl Neopentanoate
Cetyl Dimethyloctanoate	Isocetyl Isostearate	Octyldodecyl Octyldodecanoate
Cetyl Oleate	Isocetyl Laurate	Octyldodecyl Oleate
Chimyl Isostearate	Isodecyl Ethylhexanoate	Octyldodecyl Safflowerate
Chimyl Stearate	Isodecyl Hydroxystearate	Oleyl Arachidate
C10-40 Isoalkyl Acid Octyldodecanol Esters	Isodecyl Palmitate	Oleyl Linoleate
C4-5 Isoalkyl Cocoate	Isodecyl Stearate	Oleyl Stearate
C32-36 Isoalkyl Stearate	Isohexyl Laurate	Stearyl Erucate
Coco-Caprylate	Isohexyl Neopentanoate	Stearyl Linoleate
Coco-Rapeseedate	Isohexyl Palmitate	Tetradecyleicosyl Stearate
Decyl Castorate	Isolauryl Behenate	Tetradecyloctadecyl Behenate
Decyl Hempseedate	Isooctyl Caprylate/Caprate	Tetradecyloctadecyl Hexyldecanoate
Decyl Isostearate	Isooctyl Tallate	Tetradecylpropionates
Decyl Jojobate	Isopropyl Arachidate	Tridecyl Behenate
Decyl Laurate	Isopropyl Avocadate	Tridecyl Erucate
Decyl Olivate	Isopropyl Babassuate	Tridecyl Laurate

Table 8. Examples of non-cosmetic uses

Ingredient	Non-Cosmetic Use	Reference
Behenyl Behenate	used in mold releasing agents in methyl acrylamide polymer	[63]
Butyl Oleate	indirect food additive as a plasticizier in rubber articles	21CFR177.2600
	biodiesel additive; polyvinylchloride plasticizer; water-resisting agent; in hydraulic fluids	[79]
Ethylhexyl Ethylhexanoate	used in pharmaceutical preparations for improving the spreading behavior of the oil	[64]
Ethylhexyl Laurate	lubricant for friction and in paper industry; activity enhancer for pesticides	[65]
Isoamyl Laurate	direct food additive as a synthetic flavoring substance and adjuvant	21CFR172.515
Isobutyl Palmitate	indirect food additive used in fiber finishing or in textile fibers	21CFR177.2260; 21CFR177.2800
Isooctyl Tallate	indirect food additive as a plasticizer in rubber articles	21CFR177.2600
Isopropy Laurate	indirect food additive as a lubricant in the manufacture of metallic articles; use level not to exceed 10% by wt.	21CFR178.3910
Isopropyl Oleate	indirect food additive as a lubricant in the manufacture of metallic articles or in mineral oil lubricants with incidental food contact	21CFR178.3910; 21CFR178.3570

REFERENCES

1. Andersen FA (ed). Final report on the safety assessment of cetyl esters. *Int J Toxicol*. 1997;16:(Suppl 1):123-130.

2. Elder RL (ed). Final report on the safety assessment of isopropyl linoleate. *J Am Coll Toxicol*. 1992;11:(1):51-56.

3. Elder RL (ed). Final report on the safety assessment of octyl palmitate, cetyl palmitate, and isopropyl palmitate. *J Am Coll Toxicol*. 1982;1:(2):13-35.

4. Andersen FA (ed). Annual review of cosmetic ingredient safety assessments - 2002/2003. *Int J Toxicol*. 2005;24:(Suppl 1):1-102.

5. Becker LC, Bergfeld WF, Belsito DV, Hill RA, Klaassen CD, Marks JG, Shank RC, Slaga TJ, Snyder PW, and Andersen FA. Final report of the amended safety assessment of myristic acid and its salts and esters as used in cosmetics. *Int J Toxicol*. 2010;29:(Suppl 3):162-186.

6. Elder RL (ed). Final report on the safety assessment of butyl stearate, cetyl stearate, isobutyl stearate, isocety stearate, isopropyl stearate, myristyl stearate, and octyl stearate. *J Am Coll Toxicol*. 1985;4:(5):107-146.

7. Fiume MM, Bergfeld WF, Belsito DV, Hill RA, Klaassen CD, Liebler DC, Marks JG, Shank RC, Slaga TJ, Snyder PW, and Andersen FA. Final report on stearyl heptanoate and related stearyl alkanoates as used in cosmetics. 2010. Available from CIR, 1101 17th St, NW, Ste 412, Washington DC 20036; www.cir-safety.org.

8. Yao L, Hammond E, and Wang T. Melting points and viscosities of fatty acid esters that are potential targets for engineered oilseed. *Journal of the American Oil Chemists' Society*. 2008;85:(1):77-82.

9. Gottschalck T.E. and Bailey, J. E. International Cosmetic Ingredient Dictionary and Handbook. Washington, DC: Personal Care Products Council, 2010.

10. Food and Drug Administration (FDA). Frequency of use of cosmetic ingredients. *FDA Database.* 2011. Washington, DC: FDA.Updated February.

11. Johnsen MA. The influence of particle size. *Spray Technology and Marketing*. 2004;November:24-27.

12. Rothe H. Special Aspects of Cosmetic Spray Evalulation. 9-26-2011. Unpublished data presented at the 26 September CIR Expert Panel meeting. Washington, D.C.

13. Rothe H, Fautz R, Gerber E, Neumann L, Rettinger K, Schuh W, and Gronewold C. Special aspects of cosmetic spray safety evaluations: Principles on inhalation risk assessment. *Toxicol Lett*. 2011;205:(2):97-104.

14. Bremmer HJ, Prud'homme de Lodder LCH, and Engelen JGM. Cosmetics Fact Sheet: To assess the risks for the consumer; Updated version for ConsExpo 4. 2006. Report No. RIVM 320104001/2006. pp. 1-77.

15. European Commission. European Commission Health and Consumers Cosmetics - Cosing - Database. http://ec.europa.eu/consumers/cosmetics/cosing/. 2010. Date Accessed 1-13-2012.

16. European Commission. ESIS: European chemical Substances Information System. http://esis.jrc.ec.europa.eu/. 2012. Date Accessed 1-13-2012.

17. Scientific Committee on Consumer Safety. Opinion on the new classification of substances as carcinogenic, mutagenic or toxic to reproduction according to the Commission Regulation 790/2009. http://ec.europa.eu/health/scientific_committees/consumer_safety/docs/sccs_o_010.pdf. 2009. Date Accessed 1-13-2012.

18. Calloway DH, Kurtz GW, and Potts RB. Some physiologic characteristics of esters of cetyl alcohol. *Canadian Journal of Biochemistry and Physiology*. 1959;37:17-23.

19. Caussin J, Rozema E, Gooris GS, Wiechers JW., Pavel S, and ouwstra JA. Hydrophilic and lipophilic moisturizers have similar penetration profiles but different effects on SC water distribution in vivo. *Experimental Dermatology*. 2009;18:(11):954-961.

20. Fujii M, Shiozawa K, Henmi T, Yamanouchi S, Suzuki H, Yamashita N, and Matsumoto M. Skin permeation of indomethacin from gel formed by fatty-acid ester and phospholipid. *International Journal of Pharmaceutics*. 1996;137:(1):117-124.

21. Fujii M, Hori N, Shiozawa K, Wakabayashi K, Kawahara E, and Matsumoto M. Effect of fatty acid esters on permeation of ketoprofen through hairless rat skin. *International Journal of Pharmaceutics*. 2000;205:(1-2):117-125.

22. Cornwell PA, Tubek J, van Gompel HAHP, Little CJ, and Wiechers JW. Glyceryl monocaprylate/caprate as a moderate skin penetration enhancer. *International Journal of Pharmaceutics*. 1998;171:(2):243-255.

23. MB Research Laboratories Inc. 1975. Acute oral toxicity in rats and dermal toxicity in rabbits. Unpublished data submitted by the Research Institute for Fragrance Materials. 1 pages.

24. European Commission. IUCLID Dataset for 2-ethylhexyl laurate, substance ID: 20292-08-4. http://esis.jrc.ec.europa.eu/doc/existing-chemicals/IUCLID/data_sheets/20292084.pdf. 2000. Date Accessed 1-4-2012.

25. National Industrial Chemicals Notification and Assessment Scheme (NICNAS). Full Public Report. Cetiol Sensoft. File No: STD/1264. http://www.nicnas.gov.au/publications/CAR/new/Std/stdFULLR/std1000FR/std1264FR.pdf. 2008. Date Accessed 1-5-2012.

26. National Industrial Chemicals Notification and Assessment Scheme (NICNAS). Full public report. Dodecanoic acid, dimethyloctly ester. File no: NA/622. http://www.nicnas.gov.au/publications/CAR/new/NA/NAFULLR/NA0600FR/NA622FR.pdf. 1998. Date Accessed 1-5-2012.

27. Motoyoshi K, Toyoshima Y, Sato M, and Yoshimura M. Comparative studies on the irritancy of oils and synthetic perfumes to the skin of rabbit, guinea pig, rat, miniature swine and man. *Cosmetics & Toiletries*. 1979;94:(8):41-3, 45.

28. Kligman AM. 1975. Report on human maximization studies. Unpublished data submitted by the Research Institute for Fragrance Materials. 2 pages.

29. Pennick G, Harrison S, Jones D, and Rawlings AV. Superior effect of isostearyl isostearate on improvement in stratum corneum water permeability barrier function as examined by the plastic occlusion stress test. *International Journal of Cosmetic Science*. 2010;32:(4):304-312.

30. Fiume MM, Heldreth BA, Bergfeld WF, Belsito DV, Hill RA, Klaassen CD, Liebler DC, Marks JG, Shank RC, Slaga TJ, Snyder PW, and Andersen FA. Final report on dicarboxylic acids and their salts as used in cosmetics and on esters of dicarboxylic acids as used in cosmetics. 2010. Available from CIR, 1001 17th St, NW, Ste 412, Washington DCD 20036; www.cir-safety.org.

31. Burnett CL, Fiume MM, Bergfeld WF, Belsito DV, Hill RA, Klaassen CD, Liebler DC, Marks JG, Shank RC, Slaga TJ, Snyder PW, and Andersen FA. Final report on plant-derived fatty acid oils as used in cosmetics. 2011. Available from CIR, 1101 17th ST, NW, Ste 312, Washington DC 20036; www.cir-safety.org.

32. Burnett CL, Bergfeld WF, Belsito DV, Klaassen CD, Marks JG, Shank RC, Slaga TJ, Snyder PW, and Andersen FA. Final report on the safety assessment of *Cocos nucifera* (coconout) oil and related ingredients. *Int J Toxicol*. 2011;30:(Suppl 1):55-165.

33. Andersen FA (ed). Amended final report on the safety assessment of hydroxstearic acid. *Int J Toxicol*. 1999;18:(Suppl 1):1-10.

34. Andersen FA (ed). Annual review of cosmetic ingredient safety assessments - 2004/2005. *Int J Toxicol*. 2006;25:(Suppl 2):1-89.

35. Elder RL (ed). Final report on the safety assessment of hydrolyzed collagen. *J Am Coll Toxicol*. 1985;4:(5):199-221.

36. Elder RL (ed). Final report on the safety assessment of isostearic acid. *J Am Coll Toxicol*. 1983;2:(7):61-74.

37. Elder RL (ed). Final report on the safety assessment of oleic acid, lauric acid, palmitic acid, myristic acid, and stearic acid. *J Am Coll Toxicol*. 1987;6:(3):321-401.

38. Elder RL. Final report on the safety assessment of sorbic acid and potassium sorbate. *J Am Coll Toxicol*. 1988;7:(6):837-880.

39. Andersen FA (ed). Annual review of cosmetic ingredient safety assessments: 2005/2006. *Int J Toxicol*. 2008;27:(Suppl 1):77-142.

40. Johnson WJ, Bergfeld WF, Marks JG, Hill RA, Klaassen CD, Liebler DC, Marks JG, Shank RC, Slaga TJ, Snyder PW, and Andersen FA. Fi nal safety assessment of alkyl glyceryl ethers as used in cosmetics. 2011. Available from CIR, 1101 17th St, NW, Ste 412, Washington DC 20036' www.cir-safety.org.

41. Elder, RL (ed). Final report o the safety assessment of cetearyl alcohol, cetyl alcohol, isostearyl alcohol, myristyl alcohol, and behenyl alcohol. *J Am Coll Toxicol*. 1988;7:(3):359-413.

42. Andersen FA (ed). Final report of the addendum to the safety assessment of n-butyl alcohol as used in cosmetics. *Int J Toxicol*. 2008;27:(Suppl 2):53-69.

43. Johnson WJ, Bergfeld WF, Belsito DV, Hill RA, Klaassen CD, Liebler DC, Marks JG, Shank RC, Slaga TJ, Snyder PW, and Andersen FA. Final report of the Cosmetic Ingredient Review Expert Panel on the Safety Assessment of 1,2-Glycols as Used in Cosmetics. 2011. Available from CIR, 1101 17th St, NW, Ste 412, Washington DC 20036; www.cir-safety.org.

44. Heldreth BA, Bergfeld WF, Belsito DV, Hill RA, Klaassen CD, Liebler DC, Marks JG, Shank RC, Slaga TJ, Snyder PW, and Andersen FA. Final report on methyl acetate, simple acetate esters, acetic acid and salts, and related alcohols as used in cosmetics. 2010. Available from CIR, 1101 17th St, NW, Ste 412, Washington DC 20036; www.cir-safety.org.

45. Becker LC, Bergfeld WF, Belsito DV, Klaassen CD, Marks JG, Shank RC, Slaga TJ, Snyder PW, and Andersen FA. Final report of the Cosmetic Ingredient Review Expert Panel on Simmondsia Chinensis (Jojoba) Seed Oil, Simmondsia Chinensis (Jojoba) Seed Wax, Hydrogenated Jojoba Oil, Hydrolyzed Jojoba Esters, Isomerized Jojoba Oil, Jojoba Esters, Simmondsia Chinensis (Jojoba) Butter, Jojoba Alcohol, and Synthetic Jojoba Oil. 2008. Available from CIR, 1101 17th St, NW, Ste 412, Washington DC 20036; www.cir-safety.org.

46. Elder RL (ed). Final report on the safety assessment of stearyl alcohol, oleyl alcohol, and octyl dodecanol. *J Am Coll Toxicol*. 1985;4:(5):1-29.

47. Elder RL (ed). Final report on the safety assesment of arachidyl propionate. *J Am Coll Toxicol*. 1990;9:(2):143-152.

48. Elder RL (ed). Final report on the safety assessment of cetearyl octanoate. *J Am Coll Toxicol*. 1982;1:(4):81-90.

49. Johnson WJ, Heldreth BA, Bergfeld WF, Belsito DV, Hill RA, Klaassen CD, Liebler DC, Marks JG, Shank RC, Slaga TJ, Snyder PW, and Andersen FA. Final report of the Cosmetic Ingredient Review Expert Panel in the safety assessment of pelargonic acid (aka nonanoic acid) and nonanoate esters. 2010. Available from CIR, 1101 17th St, NW, Ste 412, Washington DC 20036; www.cir-safety.org.

50. Andersen FA (ed). Final Report on the Safety Assessment of Ricinus Communis (Castor) Seed Oil, Hydrogenated Castor Oil, Glyceryl Ricinoleate, Glyceryl Ricinoleate SE, Ricinoleic Acid, Potassium Ricinoleate, Sodium Ricinoleate, Zinc Ricinoleate, Cetyl Ricinoleate, Ethyl Ricinoleate, Glycol Ricinoleate, Isopropyl Ricinoleate, Methyl Ricinoleate, and Octyldodecyl Ricinoleate. *Int J Toxicol*. 2007;26:(Suppl 3):31-77.

51. Elder RL (ed). Final report on the safety assesment of decyl and isodecyl oleates. *J Am Coll Toxicol*. 1982;1:(2):85-95.

52. Andersen FA (ed). Annual review of cosmetic ingredient safety assessments - 2001/2002. *Int J Toxicol*. 2003;22:(Suppl 1):1-35.

53. Andersen FA (ed). Final report on the safety assessment of isopropyl isostearate. *J Am Coll Toxicol*. 1992;11:(1):43-49.

54. Andersen FA (ed). Annual review of cosmetic ingredient safety assessments: 2007-2010. *Int J Toxicol*. 2011;30:(Suppl 2):73-127.

55. Elder RL (ed). Final report on the safety assessment of isosteary neopentanoate. *J Am Coll Toxicol*. 1985;4:(3):1-22.

56. Andersen FA (ed). Final report on the safety assessement of stearyl heptanoate. *J Am Coll Toxicol*. 1995;14:(6):498-510.

57. Bannister WJ. Normal butyl oleate. 3-10-1931. US 1930-453101:(US 1796231):Date Accessed 5-16-1930

58. Opdyke DLJ. Monographs on fragrance raw materials. Butyl oleate. *Food and Cosmetics Toxicology*. 1979;17:(3):249.

59. Othmer DF and Rao SA. Butyl oleate from butyl alcohol and oleic acid. *Journal of Industrial and Engineering Chemistry (Washington, D.C.)*. 1950;42:1912-1919.

60. Vieville C, Mouloungui Z, and Gaset A. Synthesis and analysis of the C1 - C18 alkyl oleates. *Chemistry and Physics of Lipids*. 1995;75:(2):101-108.

61. Candy L, Vaca-Garcia C, and Borredon E. Synthesis and characterization of oleic succinic anhydrides: Structure-property relations. *Journal of the American Oil Chemists' Society*. 2005;82:(4):271-277.

62. Habulin M, Krmelj V, and Knez Z. Synthesis of oleic acid esters catalyzed by immobilized lipase. *Journal of Agricultural and Food Chemistry*. 1996;44:(1):338-342.

63. Tiwari NJ and Sawant SB. Behenic acid esters: kinetics and properties. *European Journal of Lipid Science and Technology*. 2005;107:(1):30-35.

64. Daneshfar A, Ghaziaskar HS, Shiri L, Manafi MH, Nikorazm M, and Abassi S. Synthesis of 2-ethylhexyl-2-ethylhexanoate catalyzed by immobilized lipase in n-hexane: A kinetic study. *Biochemical Engineering Journal*. 2007;37:(3):279-284.

65. Cisko-Anic B, Majeric-Elenkov M, Hamersak Z, and Sunjic V. Combined biocatalytic preparation of (R)-2-ethylhexanol and 2-ethylhexyl laurate. *Food Technology and Biotechnology*. 1999;37:(1):65-70.

66. Sanna V, Mariani A, Caria G, and Sechi M. Synthesis and evaluation of different fatty acid esters formulated into Precirol ATO-based lipid nanoparticles as vehicles for topical delivery. *Chemical & Pharmaceutical Bulletin*. 2009;57:(7):680-684.

67. Syamsul KMW, Salina MR, Siti SO, Hanina MN., Basyaruddin MAR, and Jusoff K. Green synthesis of lauryl palmitate via lipase-catalyzed reaction. *World Applied Sciences Journal*. 2010;11:(4):401-407.

68. Iyengar, BTR and Schlenk H. Melting points of synthetic wax esters. *Lipids*. 1969;4:(1):28-30.

69. Cosmetic, Toiletry, and Fragrance Association (CTFA). CTFA Compendium of Cosmetic Ingredient Composition: Descriptions. Washington, DC: CTFA, 1990.

70. ACD/Labs. Advanced Chemistry Development (ACD/Labs) Software. 1994. (11.02):As cited in Chemical Abstracts Services Registry. Date Accessed 2012

71. Environmental Protection Agency. ACToR database. http://actor.epa.gov/actor. 1-4-2012. Date Accessed 1-4-2012.

72. Syracuse Research Corporation. "PhysProp" database. 2011.

73. Cataline EL, Worrell L, Jeffries SF, and Aronson SA. Water-in-oil emulsifying agents. II. Synthesis of some cholesteryl and cetyl esters. *Journal of the American Pharmaceutical Association (1912-1977)*. 1944;33:107-108.

74. Kaufmann HP and Pollerberg J. The preparation of waxes from unsaturated fatty acids and alcohols. (Abstract). *Fette, Seifen, Anstrichmittel*. 1962;64:908-911.

75. Komppa G and Talvitie Y. Decyl series. (abstract). *Journal fuer Praktische Chemie (Leipzig)*. 1932;135:193-203.

76. Paquot C, Sorba J ., and Wieme N. The physical properties of aliphatic esters containing eighteen carbon atoms. (abstract). *Compt.rend.27e congr.intern.chim.ind., Brussels*. 1955;3.

77. Zaar B. Limpricht-Piria reaction for the preparation of aldehydes. (Abstract). *J prakt.Chim.* 1931;132:163-168.

78. Kaufmann HP and Pollerberg J. The preparation of waxes from unsaturated fatty acids and alcohols. *Fette, Seifen, Anstrichmittel*. 1962;64:908-911.

79. Linko YY, Lamsa M, Huhtala A, and Rantanen O. Lipase biocatalysis in the production of esters. *Journal of the American Oil Chemists' Society*. 1995;72:(11):1293-1299.

Data

Distributed for comment - do not cite or quote

2020
05/22

M B Research Laboratories, Inc.

STEINBERG & WENTZ ROADS
SPINNERSTOWN, PENNSYLVANIA 18968
215-536-4110

Project number MB 75-786

Date: May 22, 1975

Report to: Research Institute For Fragrance Materials, Inc.

Submitted by: D. L. Opdyke, Ph.D.

Sample marking: 75-6, butyl oleate

Test: Acute Oral Toxicity in Rats
Dermal Toxicity in Rabbits

RESULTS:	Oral	Dermal
A. LD_{50}- g/kg	greater than 5.0	greater than 5.0
Mortality	0/10	0/10

B. Distribution of Mortality

Route	Dose g/kg	Deaths/ No. of Animals	Observation Day 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Oral	5	0/10														
Dermal	5	0/10														

C. Symptomatology

Rats - diarrhea on Day 1
Rabbits - none

D. Skin Irritation

Slight redness - 3/10
Moderate redness - 7/10
Slight edema - 6/10
Moderate edema - 3/10

Respectfully submitted,

Oscar M. Moreno

Oscar M. Moreno, Ph.D.
President

SYNOPSIS

Distributed for comment - do not cite or quote

1799
05/19

OBJECTIVE:

To determine the contact-sensitizing potential of:
RIFM #75-10-6 BUTYL OLEATE

SUBJECTS:

Twenty-five healthy adult volunteers completed the experiment.

METHOD:

Pre-Testing: The material was pre-tested on five subjects in order to determine whether sodium lauryl sulfate pre-treatment was required. A patch of this material was applied to normal sites on the volar forearms for 48 hours under occlusion. No subject had any irritation from this material and it was decided to use SLS pre-treatment in the test.

Maximization Test (J.I.D.;Vol47; No.5; 393-409; 1966): This material was applied under occlusion to the same site on the volar forearms of all subjects for five alternate-day 48 hour periods. The patch site was pre-treated for 24 hours with 5% aqueous sodium lauryl sulfate under occlusion. The challenge sites were read on removal of the patch and 24 hours thereafter.

RESULTS:

Individual subject data and results are found in the Tables.

CONCLUSIONS:

There were no instances of contact-sensitization from this material on the Maximization Test.

It is unlikely that this material would present a danger of contact-sensitization in normal, intended use.

Respectfully submitted,

Albert M. Kligman, M.D., Ph.D.
May 19, 1975
AMK/bls

Distributed for comment - do not cite or quote

MAXIMIZATION RESULTS

Material: RIFM #75-10-6 BUTYL OLEATE

Subject No.	Initials	Age	Race	Sex	Challenge 48-hrs.	Challenge 72-hrs.
1	F.C.	27	W	F	0	0
2	S.R.	19	W	F	0	0
3	B.C.	18	W	M	0	0
4	N.M.	24	W	M	0	0
5	K.R.	18	B	F	0	0
6	C.O.	22	W	M	0	0
7	D.H.	19	W	F	0	0
8	P.C.	19	W	F	0	0
9	D.R.	22	W	F	0	0
10	J.C.	18	B	F	0	0
11	N.A.	20	W	M	0	0
12	C.M.	20	W	F	0	0
13	P.R.	26	W	F	0	0
14	B.S.	40	W	F	0	0
15	A.K.	41	W	M	0	0
16	J.G.	19	B	F	0	0
17	R.S.	18	W	F	0	0
18	D.S.	19	W	F	0	0
19	J.D.	34	W	M	0	0
20	J.N.	29	W	M	0	0
21	J.N.	26	W	F	0	0
22	B.K.	27	W	M	0	0
23	A.A.	39	W	F	0	0
24	C.M.	30	W	F	0	0
25	K.K.	32	W	M	0	0

CETYL ESTERS	01C - Other Baby Products	1
CETYL ESTERS	03A - Eyebrow Pencil	1
CETYL ESTERS	03C - Eye Shadow	1
CETYL ESTERS	03D - Eye Lotion	20
CETYL ESTERS	03G - Other Eye Makeup Preparatic	7
CETYL ESTERS	05A - Hair Conditioner	184
CETYL ESTERS	05E - Rinses (non-coloring)	1
CETYL ESTERS	05F - Shampoos (non-coloring)	1
CETYL ESTERS	05G - Tonics, Dressings, and Other	15
CETYL ESTERS	05I - Other Hair Preparations	58
CETYL ESTERS	06A - Hair Dyes and Colors (all type	3
CETYL ESTERS	06H - Other Hair Coloring Preparati	2
CETYL ESTERS	07A - Blushers (all types)	1
CETYL ESTERS	07B - Face Powders	1
CETYL ESTERS	07C - Foundations	8
CETYL ESTERS	07E - Lipstick	7
CETYL ESTERS	07F - Makeup Bases	1
CETYL ESTERS	07I - Other Makeup Preparations	4
CETYL ESTERS	10A - Bath Soaps and Detergents	2
CETYL ESTERS	10B - Deodorants (underarm)	1
CETYL ESTERS	10E - Other Personal Cleanliness P	1
CETYL ESTERS	11E - Shaving Cream	1
CETYL ESTERS	12A - Cleansing	14
CETYL ESTERS	12C - Face and Neck (exc shave)	9
CETYL ESTERS	12D - Body and Hand (exc shave)	30
CETYL ESTERS	12F - Moisturizing	46
CETYL ESTERS	12G - Night	8
CETYL ESTERS	12H - Paste Masks (mud packs)	7
CETYL ESTERS	12J - Other Skin Care Preps	5
CETYL ESTERS	13A - Suntan Gels, Creams, and Lic	2
CETYL ESTERS	13B - Indoor Tanning Preparations	9
ARACHIDYL BEHENATE	03B - Eyeliner	5
ARACHIDYL BEHENATE	07C - Foundations	8
ARACHIDYL BEHENATE	07E - Lipstick	2
ARACHIDYL BEHENATE	07I - Other Makeup Preparations	1
ARACHIDYL BEHENATE	12C - Face and Neck (exc shave)	2
ARACHIDYL BEHENATE	12G - Night	2
BEHENYL BEESWAX	03F - Mascara	1
BEHENYL BEHENATE	03D - Eye Lotion	1
BEHENYL BEHENATE	12C - Face and Neck (exc shave)	1
BEHENYL BEHENATE	12G - Night	1
BEHENYL ERUCATE	07E - Lipstick	8
BUTYL AVOCADATE	05F - Shampoos (non-coloring)	2
BUTYL AVOCADATE	07I - Other Makeup Preparations	1
BUTYL AVOCADATE	11G - Other Shaving Preparation Pr	1
BUTYL AVOCADATE	12C - Face and Neck (exc shave)	2
BUTYL AVOCADATE	12F - Moisturizing	1
BUTYL AVOCADATE	13A - Suntan Gels, Creams, and Lic	1
C12-13 ALKYL ETHYLHEXANOATE	03B - Eyeliner	1
C12-13 ALKYL ETHYLHEXANOATE	03C - Eye Shadow	3
C12-13 ALKYL ETHYLHEXANOATE	03G - Other Eye Makeup Preparatic	1
C12-13 ALKYL ETHYLHEXANOATE	07E - Lipstick	2
C12-13 ALKYL ETHYLHEXANOATE	07I - Other Makeup Preparations	1

C12-13 ALKYL ETHYLHEXANOATE	11A - Aftershave Lotion	1
C12-13 ALKYL ETHYLHEXANOATE	12C - Face and Neck (exc shave)	1
C12-15 ALKYL ETHYLHEXANOATE	03C - Eye Shadow	1
C12-15 ALKYL ETHYLHEXANOATE	03G - Other Eye Makeup Preparatic	1
C12-15 ALKYL ETHYLHEXANOATE	04E - Other Fragrance Preparation	2
C12-15 ALKYL ETHYLHEXANOATE	07C - Foundations	5
C12-15 ALKYL ETHYLHEXANOATE	07I - Other Makeup Preparations	1
C12-15 ALKYL ETHYLHEXANOATE	12C - Face and Neck (exc shave)	1
C12-15 ALKYL ETHYLHEXANOATE	12D - Body and Hand (exc shave)	22
C12-15 ALKYL ETHYLHEXANOATE	12F - Moisturizing	7
C12-15 ALKYL ETHYLHEXANOATE	12G - Night	2
C20-40 ALKYL STEARATE	05I - Other Hair Preparations	3
C20-40 ALKYL STEARATE	07E - Lipstick	8

Caprylyl Caprylate:

OCTYL OCTANOATE	12C - Face and Neck (exc shave)	3
OCTYL OCTANOATE	12D - Body and Hand (exc shave)	2
CAPRYLYL EICOSENOATE	12F - Moisturizing	1
CETEARYL BEHENATE	03B - Eyeliner	1
CETEARYL BEHENATE	07I - Other Makeup Preparations	1
CETEARYL CANDELILLATE	07E - Lipstick	1
CETEARYL CANDELILLATE	13C - Other Suntan Preparations	1
CETEARYL OLIVATE	01B - Baby Lotions, Oils, Powders,	1
CETEARYL OLIVATE	03D - Eye Lotion	7
CETEARYL OLIVATE	03F - Mascara	1
CETEARYL OLIVATE	03G - Other Eye Makeup Preparatic	4
CETEARYL OLIVATE	05A - Hair Conditioner	2
CETEARYL OLIVATE	05I - Other Hair Preparations	1
CETEARYL OLIVATE	07C - Foundations	1
CETEARYL OLIVATE	07F - Makeup Bases	3
CETEARYL OLIVATE	07H - Makeup Fixatives	1
CETEARYL OLIVATE	07I - Other Makeup Preparations	1
CETEARYL OLIVATE	10B - Deodorants (underarm)	1
CETEARYL OLIVATE	10E - Other Personal Cleanliness P	2
CETEARYL OLIVATE	11A - Aftershave Lotion	2
CETEARYL OLIVATE	11E - Shaving Cream	3
CETEARYL OLIVATE	12A - Cleansing	16
CETEARYL OLIVATE	12C - Face and Neck (exc shave)	7
CETEARYL OLIVATE	12D - Body and Hand (exc shave)	7
CETEARYL OLIVATE	12F - Moisturizing	33
CETEARYL OLIVATE	12G - Night	9
CETEARYL OLIVATE	12H - Paste Masks (mud packs)	2
CETEARYL OLIVATE	12J - Other Skin Care Preps	5
CETEARYL OLIVATE	13A - Suntan Gels, Creams, and Lic	1
CETEARYL OLIVATE	13B - Indoor Tanning Preparations	1
CETEARYL STEARATE	07I - Other Makeup Preparations	1
CETEARYL STEARATE	12C - Face and Neck (exc shave)	1
CETEARYL STEARATE	12D - Body and Hand (exc shave)	1

CETYL CAPRYLATE	03C - Eye Shadow	1
CETYL CAPRYLATE	03D - Eye Lotion	1
CETYL CAPRYLATE	12A - Cleansing	2
CETYL CAPRYLATE	12C - Face and Neck (exc shave)	8
CETYL CAPRYLATE	12D - Body and Hand (exc shave)	3
CETYL CAPRYLATE	12F - Moisturizing	5
CETYL ETHYLHEXANOATE	03A - Eyebrow Pencil	4
CETYL ETHYLHEXANOATE	03B - Eyeliner	9
CETYL ETHYLHEXANOATE	03C - Eye Shadow	26
CETYL ETHYLHEXANOATE	03D - Eye Lotion	4
CETYL ETHYLHEXANOATE	03E - Eye Makeup Remover	7
CETYL ETHYLHEXANOATE	03G - Other Eye Makeup Preparatic	3
CETYL ETHYLHEXANOATE	05A - Hair Conditioner	48
CETYL ETHYLHEXANOATE	05G - Tonics, Dressings, and Other	4
CETYL ETHYLHEXANOATE	05I - Other Hair Preparations	5
CETYL ETHYLHEXANOATE	06C - Hair Rinses (coloring)	1
CETYL ETHYLHEXANOATE	07A - Blushers (all types)	5
CETYL ETHYLHEXANOATE	07B - Face Powders	5
CETYL ETHYLHEXANOATE	07C - Foundations	12
CETYL ETHYLHEXANOATE	07E - Lipstick	15
CETYL ETHYLHEXANOATE	07F - Makeup Bases	16
CETYL ETHYLHEXANOATE	07G - Rouges	1
CETYL ETHYLHEXANOATE	07I - Other Makeup Preparations	4
CETYL ETHYLHEXANOATE	10E - Other Personal Cleanliness P	2
CETYL ETHYLHEXANOATE	11D - Preshave Lotions (all types)	2
CETYL ETHYLHEXANOATE	12A - Cleansing	20
CETYL ETHYLHEXANOATE	12C - Face and Neck (exc shave)	27
CETYL ETHYLHEXANOATE	12D - Body and Hand (exc shave)	17
CETYL ETHYLHEXANOATE	12F - Moisturizing	33
CETYL ETHYLHEXANOATE	12G - Night	4
CETYL ETHYLHEXANOATE	12I - Skin Fresheners	1
CETYL ETHYLHEXANOATE	12J - Other Skin Care Preps	11
CETYL ETHYLHEXANOATE	13A - Suntan Gels, Creams, and Lic	2
CETYL ETHYLHEXANOATE	13B - Indoor Tanning Preparations	4
CETYL ETHYLHEXANOATE	13C - Other Suntan Preparations	2
CETYL LAURATE	12D - Body and Hand (exc shave)	1
CETYL TALLOWATE	12J - Other Skin Care Preps	1
COCO-CAPRYLATE/CAPRATE	02A - Bath Oils, Tablets, and Salts	6
COCO-CAPRYLATE/CAPRATE	03A - Eyebrow Pencil	1
COCO-CAPRYLATE/CAPRATE	03B - Eyeliner	1
COCO-CAPRYLATE/CAPRATE	03C - Eye Shadow	12
COCO-CAPRYLATE/CAPRATE	03D - Eye Lotion	1
COCO-CAPRYLATE/CAPRATE	03G - Other Eye Makeup Preparatic	3
COCO-CAPRYLATE/CAPRATE	04E - Other Fragrance Preparation	1
COCO-CAPRYLATE/CAPRATE	05A - Hair Conditioner	1
COCO-CAPRYLATE/CAPRATE	07A - Blushers (all types)	3
COCO-CAPRYLATE/CAPRATE	07C - Foundations	2
COCO-CAPRYLATE/CAPRATE	07E - Lipstick	2
COCO-CAPRYLATE/CAPRATE	07I - Other Makeup Preparations	3
COCO-CAPRYLATE/CAPRATE	11A - Aftershave Lotion	2
COCO-CAPRYLATE/CAPRATE	11D - Preshave Lotions (all types)	2
COCO-CAPRYLATE/CAPRATE	11G - Other Shaving Preparation Pr	1
COCO-CAPRYLATE/CAPRATE	12A - Cleansing	13
COCO-CAPRYLATE/CAPRATE	12C - Face and Neck (exc shave)	22
COCO-CAPRYLATE/CAPRATE	12D - Body and Hand (exc shave)	44
COCO-CAPRYLATE/CAPRATE	12F - Moisturizing	30
COCO-CAPRYLATE/CAPRATE	12G - Night	9

COCO-CAPRYLATE/CAPRATE	12H - Paste Masks (mud packs)	3
COCO-CAPRYLATE/CAPRATE	12I - Skin Fresheners	2
COCO-CAPRYLATE/CAPRATE	12J - Other Skin Care Preps	9
COCO-CAPRYLATE/CAPRATE	13B - Indoor Tanning Preparations	11
COCO-CAPRYLATE/CAPRATE	13C - Other Suntan Preparations	1
ETHYLHEXYL ETHYLHEXANOATE	03D - Eye Lotion	1
ETHYLHEXYL ETHYLHEXANOATE	11A - Aftershave Lotion	1
ETHYLHEXYL ETHYLHEXANOATE	12C - Face and Neck (exc shave)	2
ETHYLHEXYL ETHYLHEXANOATE	12D - Body and Hand (exc shave)	13
ETHYLHEXYL ETHYLHEXANOATE	12G - Night	1
ETHYLHEXYL ETHYLHEXANOATE	12J - Other Skin Care Preps	2
ETHYLHEXYL HYDROXYSTEARATE	03B - Eyeliner	5
ETHYLHEXYL HYDROXYSTEARATE	03C - Eye Shadow	5
ETHYLHEXYL HYDROXYSTEARATE	03D - Eye Lotion	4
ETHYLHEXYL HYDROXYSTEARATE	05F - Shampoos (non-coloring)	3
ETHYLHEXYL HYDROXYSTEARATE	05G - Tonics, Dressings, and Other	1
ETHYLHEXYL HYDROXYSTEARATE	07A - Blushers (all types)	6
ETHYLHEXYL HYDROXYSTEARATE	07B - Face Powders	1
ETHYLHEXYL HYDROXYSTEARATE	07C - Foundations	5
ETHYLHEXYL HYDROXYSTEARATE	07E - Lipstick	73
ETHYLHEXYL HYDROXYSTEARATE	07G - Rouges	5
ETHYLHEXYL HYDROXYSTEARATE	07I - Other Makeup Preparations	10
ETHYLHEXYL HYDROXYSTEARATE	10A - Bath Soaps and Detergents	8
ETHYLHEXYL HYDROXYSTEARATE	10E - Other Personal Cleanliness P	3
ETHYLHEXYL HYDROXYSTEARATE	12A - Cleansing	7
ETHYLHEXYL HYDROXYSTEARATE	12C - Face and Neck (exc shave)	2
ETHYLHEXYL HYDROXYSTEARATE	12D - Body and Hand (exc shave)	44
ETHYLHEXYL HYDROXYSTEARATE	12E - Foot Powders and Sprays	2
ETHYLHEXYL HYDROXYSTEARATE	12F - Moisturizing	28
ETHYLHEXYL HYDROXYSTEARATE	12G - Night	3
ETHYLHEXYL HYDROXYSTEARATE	12H - Paste Masks (mud packs)	2
ETHYLHEXYL HYDROXYSTEARATE	12J - Other Skin Care Preps	5
ETHYLHEXYL HYDROXYSTEARATE	13B - Indoor Tanning Preparations	6
ETHYLHEXYL HYDROXYSTEARATE	13C - Other Suntan Preparations	1
ETHYLHEXYL ISOPALMITATE (OCT	03C - Eye Shadow	1
ETHYLHEXYL ISOPALMITATE (OCT	12C - Face and Neck (exc shave)	1
ETHYLHEXYL ISOPALMITATE (OCT	12D - Body and Hand (exc shave)	3
ETHYLHEXYL ISOPALMITATE (OCT	13C - Other Suntan Preparations	1
ETHYLHEXYL ISOSTEARATE	03A - Eyebrow Pencil	2
ETHYLHEXYL ISOSTEARATE	03B - Eyeliner	4
Ethylhexyl Laurate:		
OCTYL LAURATE	12C - Face and Neck (exc shave)	1
ETHYLHEXYL OLIVATE	03G - Other Eye Makeup Preparatic	1
ETHYLHEXYL OLIVATE	12F - Moisturizing	1
HEPTYLUNDECYL HYDROXYSTEAF	03C - Eye Shadow	8
HEPTYLUNDECYL HYDROXYSTEAF	07E - Lipstick	6
HEPTYLUNDECYL HYDROXYSTEAF	07G - Rouges	5
HEXYL LAURATE	01B - Baby Lotions, Oils, Powders,	3
HEXYL LAURATE	03C - Eye Shadow	1

HEXYL LAURATE	03D - Eye Lotion	1
HEXYL LAURATE	03F - Mascara	3
HEXYL LAURATE	03G - Other Eye Makeup Preparatic	9
HEXYL LAURATE	05G - Tonics, Dressings, and Other	2
HEXYL LAURATE	07A - Blushers (all types)	2
HEXYL LAURATE	07B - Face Powders	1
HEXYL LAURATE	07C - Foundations	58
HEXYL LAURATE	07D - Leg and Body Paints	2
HEXYL LAURATE	07E - Lipstick	13
HEXYL LAURATE	07F - Makeup Bases	13
HEXYL LAURATE	07G - Rouges	1
HEXYL LAURATE	07H - Makeup Fixatives	2
HEXYL LAURATE	07I - Other Makeup Preparations	16
HEXYL LAURATE	08G - Other Manicuring Preparation	1
HEXYL LAURATE	11A - Aftershave Lotion	1
HEXYL LAURATE	12A - Cleansing	1
HEXYL LAURATE	12C - Face and Neck (exc shave)	7
HEXYL LAURATE	12D - Body and Hand (exc shave)	1
HEXYL LAURATE	12F - Moisturizing	5
HEXYL LAURATE	12H - Paste Masks (mud packs)	1
HEXYL LAURATE	12J - Other Skin Care Preps	9
HEXYL LAURATE	13A - Suntan Gels, Creams, and Lic	5
HEXYL LAURATE	13B - Indoor Tanning Preparations	7
HEXYL LAURATE	13C - Other Suntan Preparations	1

HEXYLDECYL LAURATE	03D - Eye Lotion	2
HEXYLDECYL LAURATE	05A - Hair Conditioner	1
HEXYLDECYL LAURATE	12A - Cleansing	3
HEXYLDECYL LAURATE	12C - Face and Neck (exc shave)	5
HEXYLDECYL LAURATE	12D - Body and Hand (exc shave)	9
HEXYLDECYL LAURATE	12F - Moisturizing	4
HEXYLDECYL LAURATE	12G - Night	3
HEXYLDECYL LAURATE	12H - Paste Masks (mud packs)	1
HEXYLDECYL LAURATE	12J - Other Skin Care Preps	1

HEXYLDECYL STEARATE	03D - Eye Lotion	1
HEXYLDECYL STEARATE	03G - Other Eye Makeup Preparatic	1
HEXYLDECYL STEARATE	07C - Foundations	1
HEXYLDECYL STEARATE	11A - Aftershave Lotion	1
HEXYLDECYL STEARATE	12A - Cleansing	5
HEXYLDECYL STEARATE	12D - Body and Hand (exc shave)	6
HEXYLDECYL STEARATE	12F - Moisturizing	6
HEXYLDECYL STEARATE	12G - Night	4
HEXYLDECYL STEARATE	12H - Paste Masks (mud packs)	2
HEXYLDECYL STEARATE	12J - Other Skin Care Preps	2

HYDROGENATED CASTOR OIL HYD	03D - Eye Lotion	1
HYDROGENATED CASTOR OIL HYD	07I - Other Makeup Preparations	1
HYDROGENATED CASTOR OIL HYD	12D - Body and Hand (exc shave)	1
HYDROGENATED CASTOR OIL HYD	12F - Moisturizing	1

HYDROXYOCTACOSANYL HYDROX	03G - Other Eye Makeup Preparatic	1
HYDROXYOCTACOSANYL HYDROX	12F - Moisturizing	1
HYDROXYOCTACOSANYL HYDROX	12G - Night	3

Isocetyl Ethylhexanoate:

CETYL OCTANOATE, ISO	03D - Eye Lotion	1
CETYL OCTANOATE, ISO	07C - Foundations	2
CETYL OCTANOATE, ISO	07E - Lipstick	1
CETYL OCTANOATE, ISO	12C - Face and Neck (exc shave)	3

CETYL OCTANOATE, ISO	12F - Moisturizing	1
ISOCETYL PALMITATE	07A - Blushers (all types)	1
ISOCETYL PALMITATE	07C - Foundations	3
ISOCETYL PALMITATE	07I - Other Makeup Preparations	1
ISODECYL LAURATE	03E - Eye Makeup Remover	1
ISODECYL NEOPENTANOATE	03B - Eyeliner	8
ISODECYL NEOPENTANOATE	03C - Eye Shadow	7
ISODECYL NEOPENTANOATE	03D - Eye Lotion	2
ISODECYL NEOPENTANOATE	03F - Mascara	1
ISODECYL NEOPENTANOATE	03G - Other Eye Makeup Preparatic	4
ISODECYL NEOPENTANOATE	07A - Blushers (all types)	5
ISODECYL NEOPENTANOATE	07B - Face Powders	4
ISODECYL NEOPENTANOATE	07C - Foundations	14
ISODECYL NEOPENTANOATE	07E - Lipstick	8
ISODECYL NEOPENTANOATE	07G - Rouges	1
ISODECYL NEOPENTANOATE	07I - Other Makeup Preparations	5
ISODECYL NEOPENTANOATE	11G - Other Shaving Preparation Pı	1
ISODECYL NEOPENTANOATE	12A - Cleansing	2
ISODECYL NEOPENTANOATE	12C - Face and Neck (exc shave)	10
ISODECYL NEOPENTANOATE	12D - Body and Hand (exc shave)	11
ISODECYL NEOPENTANOATE	12F - Moisturizing	18
ISODECYL NEOPENTANOATE	12G - Night	5
ISODECYL NEOPENTANOATE	12H - Paste Masks (mud packs)	1
ISODECYL NEOPENTANOATE	12J - Other Skin Care Preps	3
ISODECYL NEOPENTANOATE	13A - Suntan Gels, Creams, and Lic	4
ISODECYL NEOPENTANOATE	13B - Indoor Tanning Preparations	3
Isohexyl Caprate		
ISOHEXYL DECANOATE	07I - Other Makeup Preparations	3
ISOPROPYL JOJOBATE	03D - Eye Lotion	1
ISOPROPYL JOJOBATE	03G - Other Eye Makeup Preparatic	1
ISOPROPYL JOJOBATE	07E - Lipstick	3
ISOPROPYL JOJOBATE	12D - Body and Hand (exc shave)	10
ISOPROPYL JOJOBATE	12F - Moisturizing	4
ISOPROPYL JOJOBATE	12J - Other Skin Care Preps	1
ISOPROPYL LAURATE	04E - Other Fragrance Preparation	2
ISOSTEARYL AVOCADATE	12D - Body and Hand (exc shave)	1
ISOSTEARYL BEHENATE	07C - Foundations	1
ISOSTEARYL BEHENATE	07F - Makeup Bases	1
ISOSTEARYL BEHENATE	07I - Other Makeup Preparations	3
ISOSTEARYL BEHENATE	12F - Moisturizing	1
ISOSTEARYL BENZOATE	12C - Face and Neck (exc shave)	1
ISOSTEARYL HYDROXYSTEARATE	03C - Eye Shadow	6
ISOSTEARYL HYDROXYSTEARATE	07A - Blushers (all types)	3
ISOSTEARYL HYDROXYSTEARATE	07B - Face Powders	3
ISOSTEARYL HYDROXYSTEARATE	07E - Lipstick	5
ISOSTEARYL HYDROXYSTEARATE	12G - Night	1

ISOSTEARYL ISOSTEARATE	02A - Bath Oils, Tablets, and Salts	1
ISOSTEARYL ISOSTEARATE	03D - Eye Lotion	2
ISOSTEARYL ISOSTEARATE	03G - Other Eye Makeup Preparatic	2
ISOSTEARYL ISOSTEARATE	04E - Other Fragrance Preparation	1
ISOSTEARYL ISOSTEARATE	07A - Blushers (all types)	2
ISOSTEARYL ISOSTEARATE	07C - Foundations	2
ISOSTEARYL ISOSTEARATE	07E - Lipstick	109
ISOSTEARYL ISOSTEARATE	07I - Other Makeup Preparations	2
ISOSTEARYL ISOSTEARATE	12A - Cleansing	3
ISOSTEARYL ISOSTEARATE	12C - Face and Neck (exc shave)	13
ISOSTEARYL ISOSTEARATE	12D - Body and Hand (exc shave)	12
ISOSTEARYL ISOSTEARATE	12F - Moisturizing	13
ISOSTEARYL ISOSTEARATE	12G - Night	5
ISOSTEARYL ISOSTEARATE	12H - Paste Masks (mud packs)	3
ISOSTEARYL ISOSTEARATE	12J - Other Skin Care Preps	14
ISOSTEARYL LINOLEATE	07B - Face Powders	1
ISOSTEARYL LINOLEATE	12D - Body and Hand (exc shave)	1
ISOSTEARYL PALMITATE	03C - Eye Shadow	3
ISOSTEARYL PALMITATE	03E - Eye Makeup Remover	4
ISOSTEARYL PALMITATE	05A - Hair Conditioner	1
ISOSTEARYL PALMITATE	05G - Tonics, Dressings, and Other	3
ISOSTEARYL PALMITATE	05I - Other Hair Preparations	2
ISOSTEARYL PALMITATE	07A - Blushers (all types)	1
ISOSTEARYL PALMITATE	07B - Face Powders	8
ISOSTEARYL PALMITATE	07C - Foundations	6
ISOSTEARYL PALMITATE	07E - Lipstick	3
ISOSTEARYL PALMITATE	12A - Cleansing	2
ISOSTEARYL PALMITATE	12C - Face and Neck (exc shave)	2
ISOSTEARYL PALMITATE	12D - Body and Hand (exc shave)	1
ISOSTEARYL PALMITATE	12F - Moisturizing	10
ISOSTEARYL PALMITATE	12G - Night	3
ISOSTEARYL PALMITATE	12J - Other Skin Care Preps	2
ISOSTEARYL PALMITATE	13A - Suntan Gels, Creams, and Lic	2
ISOSTEARYL PALMITATE	13B - Indoor Tanning Preparations	6
ISOTRIDECYL STEARATE	03D - Eye Lotion	1
LAURYL LAURATE	03C - Eye Shadow	1
LAURYL LAURATE	04B - Perfumes	2
LAURYL LAURATE	05G - Tonics, Dressings, and Other	1
LAURYL LAURATE	07A - Blushers (all types)	1
LAURYL LAURATE	07E - Lipstick	1
LAURYL LAURATE	07I - Other Makeup Preparations	3
LAURYL LAURATE	08C - Nail Creams and Lotions	1
LAURYL LAURATE	12D - Body and Hand (exc shave)	2
LAURYL LAURATE	12E - Foot Powders and Sprays	1
LAURYL LAURATE	12F - Moisturizing	6
LAURYL LAURATE	12G - Night	2
LAURYL PALMITATE	05A - Hair Conditioner	1
LAURYL PALMITATE	07I - Other Makeup Preparations	1
MYRISTYL LAURATE	03G - Other Eye Makeup Preparatic	1
MYRISTYL LAURATE	07E - Lipstick	1
MYRISTYL LAURATE	12A - Cleansing	1
MYRISTYL LAURATE	12C - Face and Neck (exc shave)	1

MYRISTYL LAURATE	12D - Body and Hand (exc shave)	1
MYRISTYL LAURATE	12F - Moisturizing	2
MYRISTYL LAURATE	12J - Other Skin Care Preps	1
OCTYLDODECYL ERUCATE	07I - Other Makeup Preparations	1
OCTYLDODECYL ISOSTEARATE	07E - Lipstick	1
OCTYLDODECYL NEOPENTANOATI	03C - Eye Shadow	17
OCTYLDODECYL NEOPENTANOATI	03D - Eye Lotion	1
OCTYLDODECYL NEOPENTANOATI	03G - Other Eye Makeup Preparatic	2
OCTYLDODECYL NEOPENTANOATI	05A - Hair Conditioner	1
OCTYLDODECYL NEOPENTANOATI	05G - Tonics, Dressings, and Other	1
OCTYLDODECYL NEOPENTANOATI	05I - Other Hair Preparations	7
OCTYLDODECYL NEOPENTANOATI	07A - Blushers (all types)	1
OCTYLDODECYL NEOPENTANOATI	07B - Face Powders	1
OCTYLDODECYL NEOPENTANOATI	07C - Foundations	7
OCTYLDODECYL NEOPENTANOATI	07E - Lipstick	18
OCTYLDODECYL NEOPENTANOATI	07I - Other Makeup Preparations	3
OCTYLDODECYL NEOPENTANOATI	11A - Aftershave Lotion	1
OCTYLDODECYL NEOPENTANOATI	12C - Face and Neck (exc shave)	7
OCTYLDODECYL NEOPENTANOATI	12D - Body and Hand (exc shave)	2
OCTYLDODECYL NEOPENTANOATI	12E - Foot Powders and Sprays	1
OCTYLDODECYL NEOPENTANOATI	12F - Moisturizing	24
OCTYLDODECYL NEOPENTANOATI	12G - Night	2
OCTYLDODECYL NEOPENTANOATI	12H - Paste Masks (mud packs)	1
OCTYLDODECYL NEOPENTANOATI	12J - Other Skin Care Preps	1
OCTYLDODECYL NEOPENTANOATI	13A - Suntan Gels, Creams, and Lic	1
OCTYLDODECYL NEOPENTANOATI	13B - Indoor Tanning Preparations	1
OCTYLDODECYL NEOPENTANOATI	13C - Other Suntan Preparations	3
OCTYLDODECYL OLIVATE	03G - Other Eye Makeup Preparatic	1
OCTYLDODECYL OLIVATE	12F - Moisturizing	7
OCTYLDODECYL OLIVATE	12G - Night	1
OCTYLDODECYL STEARATE	03C - Eye Shadow	21
OCTYLDODECYL STEARATE	07A - Blushers (all types)	2
OCTYLDODECYL STEARATE	07E - Lipstick	2
OCTYLDODECYL STEARATE	07G - Rouges	1
OCTYLDODECYL STEARATE	07I - Other Makeup Preparations	1
OLEYL ERUCATE	03D - Eye Lotion	1
OLEYL ERUCATE	05F - Shampoos (non-coloring)	1
OLEYL ERUCATE	07E - Lipstick	6
OLEYL ERUCATE	10E - Other Personal Cleanliness P	1
OLEYL ERUCATE	12A - Cleansing	2
OLEYL ERUCATE	12C - Face and Neck (exc shave)	7
OLEYL ERUCATE	12D - Body and Hand (exc shave)	2
OLEYL ERUCATE	12F - Moisturizing	1
OLEYL ERUCATE	12J - Other Skin Care Preps	4
OLEYL ERUCATE	13A - Suntan Gels, Creams, and Lic	6
OLEYL ERUCATE	13B - Indoor Tanning Preparations	2
OLEYL OLEATE	03C - Eye Shadow	3
OLEYL OLEATE	07B - Face Powders	3
OLEYL OLEATE	07E - Lipstick	4
OLEYL OLEATE	12A - Cleansing	1

PROPYLHEPTYL CAPRYLATE	05A - Hair Conditioner	1
PROPYLHEPTYL CAPRYLATE	07C - Foundations	1
PROPYLHEPTYL CAPRYLATE	07E - Lipstick	5
PROPYLHEPTYL CAPRYLATE	12C - Face and Neck (exc shave)	3
PROPYLHEPTYL CAPRYLATE	12F - Moisturizing	3
STEARYL BEESWAX	12A - Cleansing	1
STEARYL BEESWAX	12C - Face and Neck (exc shave)	2
STEARYL BEESWAX	12D - Body and Hand (exc shave)	5
STEARYL BEESWAX	12G - Night	1
STEARYL BEESWAX	12J - Other Skin Care Preps	1
STEARYL ETHYLHEXANOATE	05I - Other Hair Preparations	2
STEARYL ETHYLHEXANOATE	07C - Foundations	1
STEARYL ETHYLHEXANOATE	07I - Other Makeup Preparations	1
STEARYL ETHYLHEXANOATE	12F - Moisturizing	1
TETRADECYLOCTADECYL STEARA	12F - Moisturizing	1
TRIDECYL NEOPENTANOATE	03B - Eyeliner	1
TRIDECYL NEOPENTANOATE	03C - Eye Shadow	9
TRIDECYL NEOPENTANOATE	07C - Foundations	1
TRIDECYL NEOPENTANOATE	07E - Lipstick	2
TRIDECYL NEOPENTANOATE	07F - Makeup Bases	1
TRIDECYL NEOPENTANOATE	12A - Cleansing	1
TRIDECYL NEOPENTANOATE	12C - Face and Neck (exc shave)	1
Tridecyl Ethylhexanoate		
TRIDECYL OCTANOATE	04E - Other Fragrance Preparation	1
TRIDECYL OCTANOATE	07B - Face Powders	1
TRIDECYL OCTANOATE	07I - Other Makeup Preparations	1
TRIDECYL OCTANOATE	12F - Moisturizing	1
TRIDECYL STEARATE	01B - Baby Lotions, Oils, Powders,	1
TRIDECYL STEARATE	02A - Bath Oils, Tablets, and Salts	1
TRIDECYL STEARATE	04E - Other Fragrance Preparation	1
TRIDECYL STEARATE	05A - Hair Conditioner	3
TRIDECYL STEARATE	05G - Tonics, Dressings, and Other	3
TRIDECYL STEARATE	07C - Foundations	4
TRIDECYL STEARATE	07E - Lipstick	10
TRIDECYL STEARATE	07F - Makeup Bases	1
TRIDECYL STEARATE	07I - Other Makeup Preparations	1
TRIDECYL STEARATE	11A - Aftershave Lotion	3
TRIDECYL STEARATE	11E - Shaving Cream	1
TRIDECYL STEARATE	11G - Other Shaving Preparation Pr	2
TRIDECYL STEARATE	12A - Cleansing	7
TRIDECYL STEARATE	12C - Face and Neck (exc shave)	2
TRIDECYL STEARATE	12D - Body and Hand (exc shave)	16
TRIDECYL STEARATE	12F - Moisturizing	9
TRIDECYL STEARATE	12G - Night	2
TRIDECYL STEARATE	12H - Paste Masks (mud packs)	1
TRIDECYL STEARATE	12J - Other Skin Care Preps	9
TRIDECYL STEARATE	13C - Other Suntan Preparations	1