
Safety Assessment of *Malva sylvestris* (Mallow) – Derived Ingredients as Used in Cosmetics

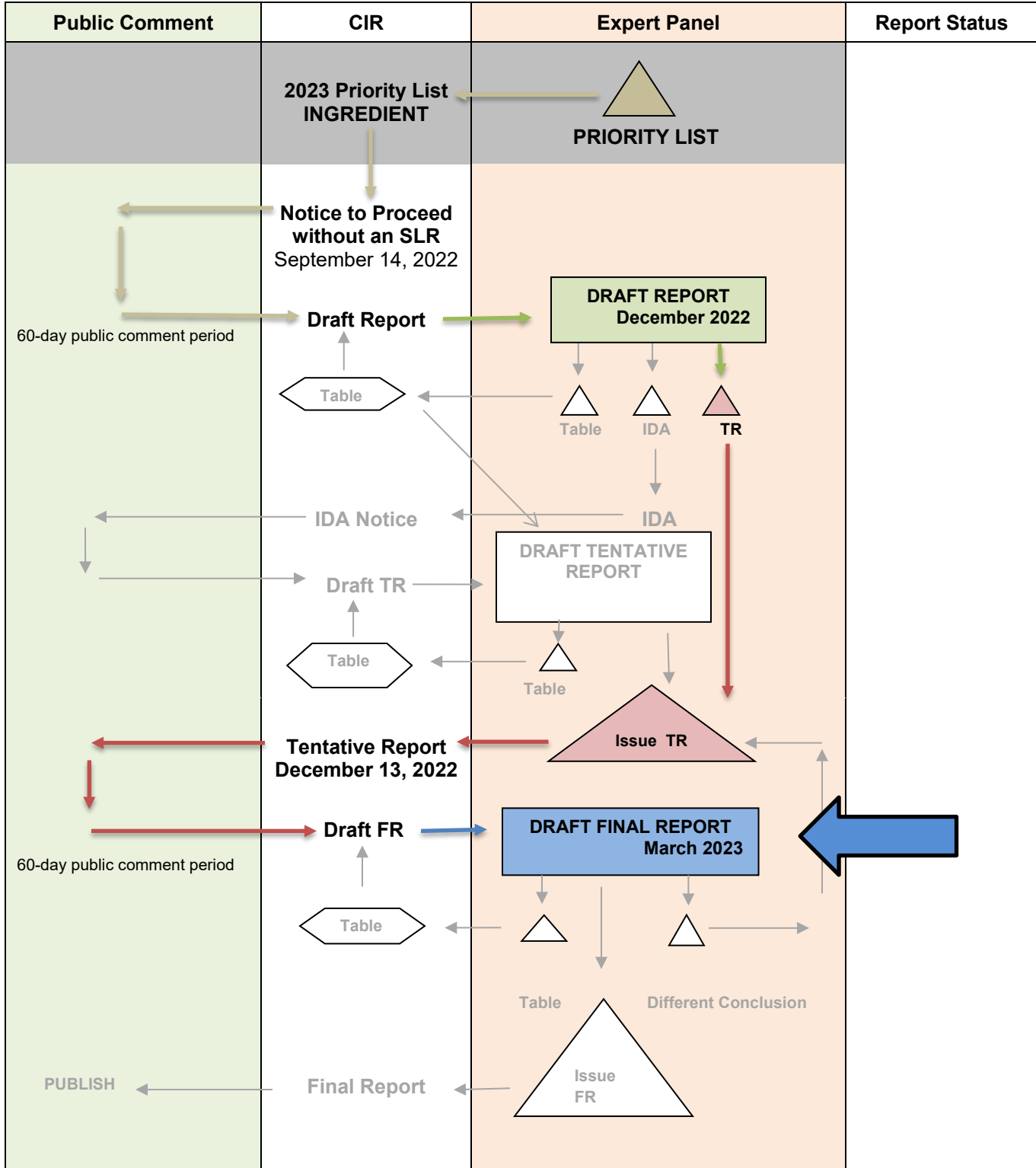
Status: Draft Final Report for Panel Review
Release Date: February 10, 2023
Panel Meeting Date: March 6-7, 2023

The Expert Panel for Cosmetic Ingredient Safety members are: Chair, Wilma F. Bergfeld, M.D., F.A.C.P.; Donald V. Belsito, M.D.; David E. Cohen, M.D.; Curtis D. Klaassen, Ph.D.; Allan E. Rettie, Ph.D.; David Ross, Ph.D.; Thomas J. Slaga, Ph.D.; Paul W. Snyder, D.V.M., Ph.D.; and Susan C. Tilton, Ph.D. The Cosmetic Ingredient Review (CIR) Executive Director is Bart Heldreth, Ph.D. This safety assessment was prepared by Preethi Raj, Senior Scientific Analyst/Writer, CIR.

SAFETY ASSESSMENT FLOW CHART

INGREDIENT/FAMILY Malva sylvestris (Mallow)-Derived Ingredients

MEETING March 2023





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Memorandum

To: Expert Panel for Cosmetic Ingredient Safety Members and Liaisons
From: Preethi S. Raj, M.Sc.
Senior Scientific Analyst/Writer, CIR
Date: February 10, 2023
Subject: Safety Assessment of *Malva sylvestris* (Mallow)-Derived Ingredients as Used in Cosmetics

Enclosed is a Draft Final Report of the Safety Assessment of *Malva sylvestris* (Mallow)-Derived Ingredients as Used in Cosmetics (identified as *report_Mallow_032023* in the pdf). This is the second time the Panel is seeing a safety assessment of these 8 cosmetic ingredients. At the December 2022 meeting, a Draft Report was presented to the Panel. The Panel acknowledged that the confirmed use of mallow as a food mitigated systemic toxicity concerns. Additionally, negative findings in human dermal irritation and sensitization studies on the Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract and Malva Sylvestris (Mallow) Flower Extract reassured the Panel of safety. The Panel noted the presence of constituents (e.g., cinnamal) which are possible sensitizers, though at levels below concern for these individual ingredients. Accordingly, the Panel issued a Tentative Report for public comment with the conclusion that the following 8 *Malva sylvestris* (Mallow)-derived ingredients are safe in cosmetic in the present practices of use and concentration described in the safety assessment when formulated to be non-sensitizing.

As per the Panel's request at the December 2022 meeting, an updated use table format has been implemented. The frequency and concentration of use is presented both cumulatively by likely duration and exposure and individually by product category.

Comments on the Tentative Report that were received from the Council (*PCPCcomments_Mallow_032023*) have been addressed. A comments response checklist is included (*response-PCPCcomments_Mallow_032023*).

Also included in this package, for your review, are a flow chart (*flow_Mallow_032023*), literature search strategy (*search_Mallow_032023*), ingredient data profile (*datapofile_Mallow_032023*), ingredient history (*history_Mallow_032023*), and transcripts from the previous meeting (*transcripts_Mallow_032023*).

The Panel should carefully consider the Abstract, Discussion, and Conclusion presented in this report. If these are satisfactory, the Panel should issue a Final Report.



Memorandum

TO: Bart Heldreth, Ph.D.
Executive Director - Cosmetic Ingredient Review

FROM: Alexandra Kowcz, MS, MBA
Industry Liaison to the CIR Expert Panel

DATE: January 4, 2023

SUBJECT: Tentative Report: Safety Assessment of *Malva sylvestris* (Mallow)-Derived Ingredients as Used in Cosmetics (release date December 13, 2022)

The Personal Care Products Council respectfully submits the following comments on the tentative report, Safety Assessment of *Malva sylvestris* (Mallow)-Derived Ingredients as Used in Cosmetics.

Method of Manufacture, *Malva Sylvestris* (Mallow) Flower Extract; Genotoxicity – Based on the trade name information in the Dictionary, the “other solvent” in the ingredients made with ethanol and butylene glycol is water.

Cosmetic Use – It should be made clear that the EU “threshold” for fragrance allergens is for labeling. The allergens need to be disclosed on the label if they exceed 0.001% in leave-on products and 0.01% in rinse-off products.

<i>Malva sylvestris</i> (Mallow)-Derived Ingredients - March 6-7, 2023 Panel Meeting – Preethi Raj			
Comment Submitter: Personal Care Products Council			
Date of Submission: January 4, 2023 (comments received on Tentative Report after December 13, 2022 posting)			
#	Report section/Comment	Response/Action	Needs Panel Input
1	Method of manufacture, Malva Sylvestris (Mallow) Flower Extract; Genotoxicity- Based on the trade name information for butylene glycolic extract, the “other solvent” is water	- Noted in all instances	
2	Cosmetic Use – clarify that the threshold for fragrance allergens pertains to labelling (disclosure required if levels exceed 0.0001% in leave-ons, and 0.01% in rinse-offs)	- clarified	

CIR History of:

***Malva Sylvestris* (Mallow)-Derived Ingredients**

January and July 2022

-Frequency of use data obtained; Concentration of use data submitted by Council

September 2022 -SLR Notice to Proceed was issued

Data received :

September 23, 2022:

Vegebios® of Mixt Mallow 1.5P (*Malva Sylvestris* (Mallow) Flower/Leaf Extract)

- CEP-Solabia Group. 2012. Manufacturing process, Ingredient breakdown,
- CEP- Solabia Group. 2015. Specifications data sheet, Safety data sheet, Attestations file

Glycolysat® of Wild Mallow UP (*Malva Sylvestris* (Mallow) Leaf Extract)

- CEP-Solabia Group. 2009. Manufacturing process
- CEP-Solabia Group. 2015. Ingredient breakdown, Specifications data sheet, Safety data sheet
- CEP-Solabia Group. 2016. Attestation file

Vegebios® Wild Mallow 1.5P (*Malva Sylvestris* (Mallow) Leaf Extract)

- CEP-Solabia Group. 2012. Manufacturing process
- CEP-Solabia Group. 2022. Ingredient breakdown, Specifications data sheet, Safety data sheet
- CEP-Solabia Group. 2015. Attestations file

September 28, 2022:

- Anonymous. 2022. *Malva Sylvestris* (Mallow) Flower Extract (method of manufacture, impurities, example specifications).

October 12, 2022:

- Anonymous. 2009. Human repeat insult patch test (product containing 0.0125% *Malva Sylvestris* (Mallow) Flower/Leaf/Stem Extract)

December 2022

-A Draft Report was presented to the Panel. The Panel concluded that the safety of these ingredients was supported by the data on confirmed food use, which mitigated systemic toxicity concerns, and negative findings in human dermal irritation and sensitization studies on the *Malva Sylvestris* (Mallow) Flower/Leaf/Stem Extract and *Malva Sylvestris* (Mallow) Flower Extract. The Panel noted the presence of constituents (e.g., cinnamal) which are possible sensitizers, though at levels below concern for these individual ingredients. Accordingly, the Panel issued a Tentative Report for public comment with the conclusion that these 8 ingredients are safe in cosmetics in the present practices of use and concentration described in the safety assessment when formulated to be non-sensitizing.

January 2023 – Comments were received from Council on the Tentative Report. No new data was received.

March 2023

A Draft Final Report is being presented to the Panel.

Malva Sylvestris (Mallow) Data Profile* - March 6-7, 2023 - Writer, Preethi Raj

					Toxicokinetics		Acute Tox			Repeated Dose Tox			DART		Genotox		Carcin		Dermal Irritation			Dermal Sensitization			Ocular Irritation		Clinical Studies		
	Reported Use	GRAS	Method of Mfg	Constituents/Impurities	Dermal Penetration	ADME	Dermal	Oral	Inhalation	Dermal	Oral	Inhalation	Dermal	Oral	In Vitro	In Vivo	Dermal	Oral	In Vitro	Animal	Human	In Vitro	Animal	Human	Phototoxicity	In Vitro	Animal	Retrospective/Multicenter	Case Reports
Malva Sylvestris (Mallow) Extract	X		X	X																									
Malva Sylvestris (Mallow) Flower	X																												
Malva Sylvestris (Mallow) Flower Extract	X		X	X										X					X	X			X	X					
Malva Sylvestris (Mallow) Flower/Leaf Extract	X		X	X																									
Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract	X		X	X																			X						
Malva Sylvestris (Mallow) Leaf Extract	X		X	X							X																		
Malva Sylvestris (Mallow) Leaf Powder	X		X																										
Malva Sylvestris (Mallow) Oil	X		X	X																									

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

sylvestris mallow flower leaf stem extract)) OR (mallow blossom extract)) OR (vegebios of mixt mallow)) OR (bluemallow)) OR (malva sylvestris (malvenblueten) flower Extract)) OR (phytami common mallow flower)) OR (vitactyl)) OR (glycolysat of wild mallow)) OR (malva sylvestris mallow leaf extract)) OR (mallow leaf powder)) OR (mallow powder)) OR (malva sylvestris mallow leaf powder)) OR (mallow oil)) OR (malva sylvestris oil)) OR (malva sylvestris mallow oil)) OR (malva sylvestris leaf oil)) OR (malva sylvestris flower powder)) OR (mallow flower powder)) OR (malva sylvestris mallow flower leaf stem water)) OR (mallow flower leaf stem water)) OR (mallow water)) OR (mallow leaf water)) OR (malva sylvestris leaf water) – 152/6 – nothing new or useful

- AND mutagenicity – 0/0
- AND carcinogenicity – 0/0
- AND developmental toxicity – 0/0
- AND reproductive toxicity – 2/0
- AND skin lightening/ depigmentation – 0/0
- AND impurities – 0/0
- AND heavy metal limits – 3/0
- AND dermal irritation – 0/0
- AND dermal sensitization – 0/0

Blue mallow toxicity – 0/0

Mallow acute oral toxicity – 98/1

Malva sylvestris acute oral toxicity – 24/2

General Search

Malva sylvestris dermal sensitization – 43/0

Malva sylvestris dermal irritation – 85/2

Wild mallow dermal irritation – 112/0

Wild mallow dermal sensitization – 69/0

Malva sylvestris systemic toxicity – 55/5

0 use ingredients to search:

Malva Sylvestris (Mallow) Flower Powder – 115/0

Malva Sylvestris (Mallow) Flower/Leaf/Stem Water – 101/1

Malva Sylvestris (Mallow) Leaf Water – 154/2

mallow leaf water oral toxicity – 59/0

LINKS**Search Engines**

- Pubmed (- <http://www.ncbi.nlm.nih.gov/pubmed>)
- Toxnet (<https://toxnet.nlm.nih.gov/>); (includes Toxline; HSDB; ChemIDPlus; DART; IRIS; CCRIS; CPDB; GENE-TOX)
- Scifinder (<https://scifinder.cas.org/scifinder>)

appropriate qualifiers are used as necessary

search results are reviewed to identify relevant documents

Pertinent Websites

- wINCI - <http://webdictionary.personalcarecouncil.org>
- FDA databases <http://www.ecfr.gov/cgi-bin/ECFR?page=browse>
- FDA search databases: <http://www.fda.gov/ForIndustry/FDABasicsforIndustry/ucm234631.htm>;
- EAFUS: <http://www.accessdata.fda.gov/scripts/fcn/fcnavigation.cfm?rpt=eafuslisting&displayall=true>
- GRAS listing: <http://www.fda.gov/food/ingredientspackaginglabeling/gras/default.htm>
- SCOGS database: <http://www.fda.gov/food/ingredientspackaginglabeling/gras/scogs/ucm2006852.htm>
- Indirect Food Additives: <http://www.accessdata.fda.gov/scripts/fdcc/?set=IndirectAdditives>
- Drug Approvals and Database: <http://www.fda.gov/Drugs/InformationOnDrugs/default.htm>
- <http://www.fda.gov/downloads/AboutFDA/CentersOffices/CDER/UCM135688.pdf>
- FDA Orange Book: <https://www.fda.gov/Drugs/InformationOnDrugs/ucm129662.htm>
- OTC ingredient list:
<https://www.fda.gov/downloads/aboutfda/centersoffices/officeofmedicalproductsandtobacco/cder/ucm135688.pdf>
- (inactive ingredients approved for drugs: <http://www.accessdata.fda.gov/scripts/cder/iig/>)
- HPVIS (EPA High-Production Volume Info Systems) - <https://ofmext.epa.gov/hpvis/HPVISlogon>
- NIOSH (National Institute for Occupational Safety and Health) - <http://www.cdc.gov/niosh/>
- NTIS (National Technical Information Service) - <http://www.ntis.gov/>
- NTP (National Toxicology Program) - <http://ntp.niehs.nih.gov/>
- Office of Dietary Supplements <https://ods.od.nih.gov/>
- FEMA (Flavor & Extract Manufacturers Association) - http://www.femaflavor.org/search/apachesolr_search/
- EU CosIng database: <http://ec.europa.eu/growth/tools-databases/cosing/>
- ECHA (European Chemicals Agency – REACH dossiers) – <http://echa.europa.eu/information-on-chemicals;jsessionid=A978100B4E4CC39C78C93A851EB3E3C7.live1>
- ECETOC (European Centre for Ecotoxicology and Toxicology of Chemicals) - <http://www.ecetoc.org>
- European Medicines Agency (EMA) - <http://www.ema.europa.eu/ema/>
- IUCLID (International Uniform Chemical Information Database) - <https://iuclid6.echa.europa.eu/search>
- OECD SIDS (Organisation for Economic Co-operation and Development Screening Info Data Sets)-
<http://webnet.oecd.org/hpv/ui/Search.aspx>
- SCCS (Scientific Committee for Consumer Safety) opinions:
http://ec.europa.eu/health/scientific_committees/consumer_safety/opinions/index_en.htm
- NICNAS (Australian National Industrial Chemical Notification and Assessment Scheme)-
<https://www.nicnas.gov.au/>
- International Programme on Chemical Safety <http://www.inchem.org/>
- FAO (Food and Agriculture Organization of the United Nations) - <http://www.fao.org/food/food-safety-quality/scientific-advice/jecfa/jecfa-additives/en/>
- WHO (World Health Organization) technical reports - http://www.who.int/biologicals/technical_report_series/en/
- www.google.com - a general Google search should be performed for additional background information, to identify references that are available, and for other general information

Botanical Websites, if applicable

- Dr. Duke's - <https://phytochem.nal.usda.gov/phytochem/search>
- Taxonomy database - <http://www.ncbi.nlm.nih.gov/taxonomy>
- GRIN (U.S. National Plant Germplasm System) - <https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysimple.aspx>
- Sigma Aldrich plant profiler- <http://www.sigmaaldrich.com/life-science/nutrition-research/learning-center/plant-profiler.html>
- American Herbal Products Association Botanical Safety Handbook (database) -
<http://www.ahpa.org/Resources/BotanicalSafetyHandbook.aspx>
- European Medicines Agency Herbal Medicines -
http://www.ema.europa.eu/ema/index.jsp?curl=pages/medicines/landing/herbal_search.jsp
- National Agricultural Library NAL Catalog (AGRICOLA) <https://agricola.nal.usda.gov/>
- The Seasoning and Spice Association List of Culinary Herbs and Spices
http://www.seasoningandspice.org.uk/ssa/background_culinary-herbs-spices.aspx

DECEMBER 2022 PANEL MEETING – INITIAL REVIEW/DRAFT REPORT

Belsito Team – December 5, 2022

DR. BELSITO: Okay. We have methyl alcohol. We have Wave 3 comments.

MS. RAJ: Mallow.

DR. BELSITO: Oh, Mallow. That's right. Sorry. We have Wave 2 and Wave 3 comments on Mallow. Before we actually look at the document.

MS. RAJ: Wave 2 is summary data, and Wave 3 were mostly editorial comments.

DR. BELSITO: But there was one comment on Wave 3 that I didn't know how you were going to -- it says, "Were you able to find the volume or dose that was applied dermally and what were the results in the dermal exposure?" This was on photoprotective effects. Was there a comment?

MS. RAJ: Well, there is mention of one milliliter of the Mallow extract being given before radiation. So, let me see what that comment is saying. It says amount not specified. I mean, I can verify that that's not provided.

DR. BELSITO: Okay. And then there was data in Wave 2 on flower moisture. What the heck is flower moisture? And how does that help us in this? It's not an ingredient where we're viewing. Carol, any comments?

DR. EISENMANN: It's probably what they're using as a trade name.

DR. BELSITO: Okay. I mean, I had just, is flower extract and flower moisture the same? I don't have a clue.

MS. RAJ: It seems to be referring to the weight with manufacture, Dr. Belsito, because if you see --

DR. EISENMANN: It's a water extract?

MS. RAJ: Yeah. Because if you see Page 1, it looks like those suffixes are indicative of the solvent it was extracted in. Because BG is butylene glycol and SQ is referring to being dissolved in squalene.

DR. BELSITO: So, you think those are just flower extracts?

MS. RAJ: Yes.

DR. BELSITO: Okay. So, flower extract and flower moisture is essentially the same thing?

DR. EISENMANN: Yes. It's a water extract. All of the information is on the INCI name, *Malva sylvestris*, Mallow flower extract. Then those other names, they're trade names. They're using different solvents to do the extraction, and so the moisture is water.

DR. BELSITO: Okay.

DR. EISENMANN: This is coming from an Asian country, so it's partly translation issues, too, I think.

DR. BELSITO: Okay.

DR. RETTIE: So, it would be synonymous with flower and water. We had something a little earlier --

DR. EISENMANN: Well, this is a water extract. For the dictionary, they use water as part of the distillation process. So, this is a water extract instead of a distillation process.

MS. RAJ: And Carol, we can assume that the dry raw material is the flowers?

DR. EISENMANN: Right.

DR. BELSITO: Okay. On PDF, Page 13, the Mallow extract, I just have a question. Is what we're seeing here sufficient? Because to me, it tells me nothing. The total phenolic content in hexane, dichloromethane -- dah, dah, dah -- of the whole plant was determined. The phenolic content was this. Total flavonoid was this. And they were the highest of dichloromethane extracts. So, are you happy with that level of composition?

DR. RETTIE: Can you say again? Which PDF page?

DR. BELSITO: Bottom of page 13.

DR. RETTIE: Well, I've got a note that the extraction processes are very varied through this. We kind of need better composition data for each. So, not completely happy with it.

DR. BELSITO: Okay. And then the flower extract now will contain the flower moisture as a water extract from Wave 2.

DR. SNYDER: This is actually pretty good composition data for a botanical, though, isn't it?

DR. BELSITO: Yeah, I know. That's why I asked.

DR. SNYDER: Yeah, I think it's pretty good, actually.

DR. BELSITO: And then from Wave 2, we get data from Tannins and Anthocyanins in the flower extract. But the impurities, we get only metal specified. And of course, we'd have the boilerplate for pesticides as well. Is that sufficient?

DR. SNYDER: It's got that one that got all the way down to 0.0001 percent cinnamal.

DR. RETTIE: I don't know. I'm not sure that I agree that there is a great deal of information in here for these given the different extraction processes. It's very descriptive.

DR. BELSITO: Right.

DR. RETTIE: I agree. It's probably quite a lot for a botanical.

DR. SNYDER: I mean, yeah.

DR. RETTIE: It doesn't delve into the weeds here.

DR. SNYDER: Yeah. It did say it was devoid of diethylene. That's good.

DR. BELSITO: Under non-cosmetic uses, you state that across cultures it's a traditional herb and food. We're looking at different parts of this plant. What are the traditional herbs and foods?

MS. RAJ: I think that's referring to the whole plant. Would you want, I guess, examples of food uses?

DR. BELSITO: Well, I mean, I'm just wondering if the stem is also considered a food use.

MS. RAJ: Okay.

DR. BELSITO: And also, is it just a flower? Is it a leaf as well that's used as a food?

DR. EISENMANN: But what I found, and I didn't put a reference down on it when I was just doing internet search, it's leaves, seeds, flowers and buds.

DR. BELSITO: Are used as foods?

DR. SNYDER: Say that again.

DR. EISENMANN: Leaves, seeds, flowers and buds --

DR. BELSITO: Leaves, seeds, flowers and buds.

DR. EISENMANN: -- are all eaten.

DR. BELSITO: Which leaves the stem.

DR. EISENMANN: I wouldn't pull that out as a separate plant. I think they're crazy if they're making something just from the stem, but.

DR. BELSITO: What?

DR. EISENMANN: I think they're crazy if they're making something just from the stem. But, you know, probably if stems are included in with leave and flowers.

DR. RETTIE: So, this is part of the hibiscus family, Mallow? I think that's what I came up with. You can eat everything on hibiscus plants, depending on the stems.

DR. BELSITO: Flower and leaf.

DR. SNYDER: Seed and bud.

DR. BELSITO: Bud and seed. And the stem just goes along for the ride.

DR. SNYDER: Fiber.

DR. BELSITO: What?

DR. SNYDER: Fiber.

DR. BELSITO: Fiber.

DR. RETTIE: I have three gallons of hibiscus-infused hard cider. I'm getting prepared for Christmas.

DR. SNYDER: I have five beautiful hibiscus plants lining my pool deck at my house.

DR. RETTIE: Bring me some flowers, I won't need to buy them --

DR. BELSITO: No house.

DR. SNYDER: Beautiful flower.

DR. BELSITO: Lining your pool?

DR. SNYDER: They're actually blossoming beautifully. The flowers are gorgeous.

DR. BELSITO: Okay.

MS. RAJ: Is the Panel okay with the HRIPT data you received in Wave 2?

DR. BELSITO: We're getting a little giddy here, folks.

DR. SNYDER: Oh, sorry.

DR. BELSITO: Come on, children.

DR. SNYDER: What's that? What was the question?

MS. RAJ: I was saying are you all satisfied with the HRIPT data you received in Wave 2?

DR. SNYDER: Yeah, 10 percent?

MS. RAJ: Yes.

DR. SNYDER: Yeah, 54 at 10 percent. Yes, patch test at 10 percent, 34 negative.

MS. RAJ: I'm just curious If perhaps you would want the subject level data?

DR. SNYDER: The dermal sensitization in the rabbits was a little weak with only three rabbits. But with that other HRIPT data, they were fine. I know you'd like to have a few more.

DR. RETTIE: Am I missing some concentration here? I got a note that -- used at 0.0125. Perhaps, it seems like it was 8-fold less than the maximum use concentration.

MS. RAJ: In Wave 2. What's in the report is for the flower, leaf, stem extract. It's 0.0125 percent.

DR. RETTIE: Yeah.

MS. RAJ: Which is lower than the maximum, which I believe is 0.1.

DR. RETTIE: 0.1.

DR. BELSITO: All right. We're going to make it, formulated to be non-sensitizing.

MS. RAJ: Okay.

DR. BELSITO: Because it does have cinnamates in it. So, genotox, we have a negative AMES for the flower extract and flower moisture, but we now told that they're food, so we're not concerned about the lack of genotox.

Just to go back on PDF, Page 15, under non-cosmetic use, the second line you said, "and anaphylactic against heartburn." I presume you mean prophylactic?

MS. RAJ: Yeah. That would maybe make more sense.

DR. RETTIE: That's unfortunate.

DR. BELSITO: Might as well just kill you off. Anaphylactic. It gave me a chuckle. Thank you.

So, the topical was also photoprotective. That was the question that came up in Wave 3. So, Wave 2, we have the flower extract was neat, non-irritant. I mean, I think we're fine with sensitization and irritation, but we're going to formulate to be non-sensitizing.

DR. SNYDER: So, the only issue is the stem?

DR. BELSITO: The only issue is the stem.

MS. FIUME: So, the stem actually is eaten.

DR. SNYDER: Is it?

MS. FIUME: Tender leaves and stems are consumed, according to this paper.

DR. BELSITO: Okay. And that's in the report someplace, or it will now be?

MS. FIUME: So the area you were asking for clarification of, we can expand because it does give the plant parts.

DR. BELSITO: Okay. On PDF, Page 17, the study with a 4 percent Mallow ointment, does it state what part of the plant or whether it's a whole plant extract?

MS. RAJ: I remember those papers were very vague. They didn't really say, but I can have a look.

DR. BELSITO: Okay. So, in the discussion, we need the respiratory boilerplate. We need the usual botanical boilerplate with heavy metals and pesticides. And the conclusion, now, I just have a lot of stuff that I guess I misinterpreted. So it's not a food, it's homeopathic medicine, but we're now told that it's all food.

MS. RAJ: What language would the Panel want in the discussion to explain, I guess, the data gaps? I know you mentioned the food use.

DR. BELSITO: Well, I mean, I just had for conclusions was to ask my other panel members were the composition and impurities okay and whether we needed more data. But I'm hearing that you're okay with that.

DR. SNYDER: Yes.

DR. BELSITO: Okay. We're now being told that all parts of the plants are food use.

MS. FIUME: And they all are also homeopathic medicine.

DR. BELSITO: So, that needs to be included. So, that gets rid of our systemic tox needs.

DR. RETTIE: Did you want to mention in the discussion that, perhaps, a positive skin eczema and atopic dermatitis properties. Or is that something that usually doesn't go in? It just seem like a positive thing.

DR. BELSITO: I don't know that it needs to go in.

DR. RETTIE: I just wondered if (inaudible) safe as used. No?

DR. BELSITO: I have another question. Oil, is the composition okay? 28-day dermal and sensitization and irritation at use concentration.

MS. RAJ: Sorry, say that again.

DR. BELSITO: I just have another comment here. So, the oil extract is not an ingredient.

DR. SNYDER: Yes, it's oil.

DR. BELSITO: Oil, is the composition okay?

DR. SNYDER: It's on Page 14, the composition of the oil. It's at the bottom.

DR. RETTIE: 143 Volatile compounds. It seems a pretty common answer.

DR. BELSITO: Okay.

MS. FIUME: So, the oil is sufficient? It's not an INCI ingredient, so we don't have a definition as to what -- how -- where it come from, the plant.

DR. BELSITO: It's probably going to come from the flower, right?

DR. SNYDER: It says here on Page 13, Mallow oil is the aerial portions of the plant, were air-dried, fine powder and were extracted by hydrodistillation.

MS. RAJ: Oh, okay. Thank you.

DR. BELSITO: And, Carol, I know we ask this all the time and you say you try and get it, but the Mallow, as supplied, has very little actual Mallow in it. It has a lot of vehicle that it was extracted in. So these concentrations that we're seeing, are they concentrations of the actual Mallow or Mallow as supplied?

DR. EISENMANN: I suppose I ask for the concentration of the named ingredient, so it should be Mallow. That's what I asked for. Can I guarantee that that's what you're getting? No.

DR. BELSITO: Right. I have to ask the question. I know the answer.

DR. EISENMANN: Right. But they're pretty low levels.

DR. BELSITO: Okay.

DR. EISENMANN: So -- here I'll say it. If they come back and say they're using 10 percent, then I'll say is this really the concentration of Mallow or is it the concentration of the raw material?

DR. BELSITO: Right.

DR. EISENMANN: But if we have low concentration, I don't necessarily go back and say hey, are you doing this correctly?

DR. BELSITO: Right.

DR. RETTIE: Cause you not .1.

DR. BELSITO: Because if anything, it would be even lower.

DR. EISENMANN: Right. Right.

DR. BELSITO: Okay.

MS. RAJ: On PDF, Page 14, at the bottom, it does actually say in one of the descriptions that oil was made from flowers.

DR. SNYDER: Yes.

DR. BELSITO: So, then I think where we're at is safe as used?

DR. SNYDER: I think so. And formulated to be non-sensitizing.

MS. RAJ: So, no need to have the caveat then?

DR. BELSITO: Well, formulated to be non-sensitizing, yes.

MS. RAJ: Okay.

MS. FIUME: I'm sorry, Don, what did you say the constituents of concerns are for the sensitization?

DR. SNYDER: Cinnamal.

MS. FIUME: Cinnamal? Okay.

DR. SNYDER: Respiratory boilerplate, heavy metal boilerplate.

DR. BELSITO: Yeah, that's it.

MS. RAJ: And systemic tox?

DR. BELSITO: Food use eliminating the need for systemic toxicity.

DR. SNYDER: Yep. I guess we're slow, the other group is done.

DR. BELSITO: They're done? How do you know?

DR. SNYDER: They just came in there. They just all came in.

DR. BELSITO: Oh, wow. Maybe they got sick of the other group and needed to come to the group that was so insane.

MS. FIUME: Curt has something to say.

DR. SNYDER: Curt, go ahead.

DR. BELSITO: We can't hear you, Curt.

MS. FIUME: He cannot unmute.

Cohen Team – December 5, 2022

DR. COHEN: Mallow. Just off the record, I bought six boxes of Mallomars for lunch we'll put out. Making an attempt to make it GRAS. But I think if you're not from New York you may not know that Nabisco makes Mallomars and it's only sold in the winter in New York. York area and other suburbs of New York and Florida.

So, Mallow. It's the first time reviewing it. It's a draft report. This assessment has eight derived ingredients and it's used as an exfoliant. We have frequency of use in 198 formulations for the extract. And 184 -- I'm sorry, 72 for the flower extract.

We have max use at 0.1 percent in a non-body spray and hand product and 0.1 percent in a depilatory. The extract is the whole plant. We have method of manufacturing. I see irritation and sensitization we have at only one-tenth of max use.

DR. ROSS: On which one?

DR. COHEN: On flower, leaf, stem extract. And then we have on the second wave, flower extract at 10 percent.

DR. ROSS: Yeah.

DR. COHEN: But I have a note here to ask for the study. As far as I saw it was just in a --

MS. RAJ: Summary.

DR. COHEN: -- a summary and it said mild material and I didn't know what that was.

MS. RAJ: Yes. And another thing the panel may perhaps want clarification on. If you notice in the method of manufacture summary details they gave, it just says dried material even though it's referring to flower extracts.

DR. ROSS: Yeah.

DR. COHEN: Yeah, I thought that just meant dried flowers, but okay. So, what are our needs here other than what I just mentioned?

DR. TILTON: So, we don't have concentrations used in the lipstick and eye formulations, which we would need for ingestion ocular.

DR. ROSS: That was exactly my comment. You've been reading my notes here. So.

DR. COHEN: Tom?

DR. SLAGA: Yes. I hear you.

DR. COHEN: What were your thoughts and needs on this?

DR. SLAGA: With the Mallow? Is that what we're on?

DR. COHEN: Yeah.

DR. SLAGA: Okay, well the flower extract has a reasonable amount of data and I really don't know if we need any more there. But the rest of the ingredients, we had very little, so we need to add all the basics -- toxicological endpoints.

DR. COHEN: So, you want acute dermal tox?

DR. SLAGA: Dermal tox, dermal irritation, sensitization, genotox, all of them. Whatever we get, it's a draft report.

DR. COHEN: So, we need that on everything. Well, we have oral tox on the extract, which is the whole plant.

DR. SLAGA: Yeah, flower extract.

DR. TILTON: So, is that correct? I mean, I made a note somewhere that the current data was for the leaf extract.

DR. ROSS: Yeah.

MS. RAJ: Yeah, most of it is for the leaf extract. Yeah.

DR. ROSS: That's the subchronic study, right? It's not a leaf extract for 60 days.

DR. COHEN: Why is the table not looking like that? We have dermal irritation and sensitization on leaf flower extract, right?

MS. RAJ: Yeah, flower leaf extract.

DR. SLAGA: Right.

DR. COHEN: And we have oral tox on the extract, is that correct?

DR. TILTON: Yes, looks like. That's what's in the table. I had just made a note, but I thought that the text had referred to the leaf extract for oral.

MS. RAJ: Yes, that's the subchronic study you're referring to, right?

DR. COHEN: So, if we have tox on the whole plant chopped up, can't we just -- it's not a read across, it's more like a drag across. But doesn't that count? Do we really need to ask for more if we have the entire plant?

DR. SLAGA: The first extract is the entire plant, right?

DR. COHEN: The extract, I believe, is the entire plant. So, if we have tox on the entire plant, aren't we good for the rest of these?

DR. ROSS: Let's look at the method of manufacture. The Mallow extract is just chopping the whole thing up, right, and grinding it and then extracting it with methanol.

DR. COHEN: That's the extract, right?

DR. ROSS: Yeah.

DR. COHEN: Yeah.

DR. ROSS: That's the whole thing, right?

DR. COHEN: The whole plant.

DR. ROSS: And if you look at the --

DR. SLAGA: The whole plant doesn't have much data.

DR. COHEN: Right. We only have it for the leaf. It says subchronic toxicity for the leaf extract.

DR. SLAGA: Yeah, the leaf has a good bit.

DR. ROSS: But the leaf extract --

DR. COHEN: Is the table right?

MS. RAJ: Where are you looking?

DR. COHEN: The one at the start of the --

MS. RAJ: Table 1?

DR. COHEN: Well, this table.

MS. RAJ: Hold on.

DR. HELDRETH: The search table.

DR. COHEN: This has tox as the extract.

MS. RAJ: Yes. Actually, I see what you're saying, yeah. I think that X should be for the flower and leaf extract -- sorry, the leaf extract.

DR. TILTON: The leaf extract. Yeah.

DR. COHEN: Okay. So, we have -- then we're back. Dermal tox and irritation, sensitization -- irritation and sensitization, genotox on all components except the leaf extract, right? Because we have dermal sensitization and irritation, and we have tox.

DR. ROSS: I just want to comment that when you look at the methods of manufacture on the leaf extract, you know, there's a steam distillation in there. And so, you might get different end products. They're just chopping up the plant and doing just a straight, simple extraction.

DR. COHEN: Yeah.

DR. ROSS: So, that's the problem with these botanicals, you know, they're all extracted in different ways and you're not sure what you've got. So, there may not be equivalent.

DR. COHEN: So, we're still going to ask for --

DR. ROSS: What are we asking for?

DR. COHEN: Yeah. Dermal tox.

DR. TILTON: I think we should request oral tox too just because of the --

DR. ROSS: Lipstick.

DR. TILTON: -- lipstick formulation, it's a pretty high amount of uses.

DR. COHEN: Dermal and oral tox, irritation and sensitization. Genotox on all components, except the leaf extract. We need irritation and sensitization of the leaf stem extract at max use. And we want to see the HRIPT on the flower extract, see the study.

DR. SLAGA: Yeah. Sounds good.

MS. RAJ: Can I repeat that back, Dr. Cohen?

DR. COHEN: Do you want me to repeat it back or do you want to repeat? You're going to repeat it back?

MS. RAJ: I'll try.

DR. COHEN: Okay. Yes.

MS. RAJ: Sounds like you want acute tox. You want oral tox, dermal tox, dermal irritation and sensitization. And this is, I'm assuming, for all ingredients?

DR. COHEN: I have except a leaf extract.

MS. RAJ: Except -- okay. Except for the leaf extract. Because you also said genotox on all ingredients except the leaf extract. Irritation and sensitization of the leaf and stem extract at maximum concentration of use. And you would like the subject level study information for the flower extract that we received. Yep.

DR. ROSS: I think we had ocular thrown in there as well.

MS. RAJ: Oh.

DR. COHEN: The concentration of use for lip and eye products.

DR. BERGFELD: Well.

MS. RAJ: Oh, yes.

DR. BERGFELD: Usually, we say what's available because they don't retest animals.

DR. ROSS: No. Yeah, but as long -- I mean, they could do molecular rather than animal tests.

DR. BERGFELD: I haven't seen any molecular studies on the eye. Have we seen those, Bart?

DR. ROSS: Yeah, yeah.

DR. COHEN: There's some model ocu- --

DR. ROSS: And there's --

DR. BERGFELD: Epicute?

DR. HELDRETH: EpiOcular.

DR. COHEN: EpiOcular.

DR. ROSS: And then there's these --

DR. BERGFELD: EpiOcular.

MS. RAJ: So are we adding concentrations of use for lip and eye --

DR. COHEN: Products.

MS. RAJ: Products, okay. And just to be clear is acute tox included in the needs as well, or no?

DR. COHEN: Susan, are we going to ask for acute tox --

DR. ROSS: Because of the lipstick?

DR. COHEN: -- because of the lipstick?

MS. RAJ: Okay. Yeah.

DR. COHEN: Any other comments or needs?

DR. TILTON: Just for the ocular.

DR. SLAGA: No. I like what we asked for so far.

MS. RAJ: Yes. So, are you asking for ocular tox on all ingredients, Dr. Cohen?

DR. COHEN: Oh.

DR. ROSS: Just where they're used. So --

DR. COHEN: We want a concentration of use, so should we add ocular tox in the area -- for which ones? We gotta be specific? Let's go to the table?

MS. RAJ: (Inaudible) extract and flower extract?

DR. ROSS: Yeah.

DR. BERGFELD: We had some Wave 2 information on flower extract.

DR. COHEN: Yeah. That was the HRIPT. You know, that was --

DR. BERGFELD: No, it's more than that.

DR. COHEN: Yeah, no, there was like a whole lot of stuff on it. Yes?

DR. ROSS: Yes, so the ocular, I think, is only the Mallow extract which is most of them.

DR. COHEN: Which is which one?

DR. ROSS: Ocular. The eye area?

DR. COHEN: No, which one do we want?

DR. ROSS: Mallow extract. The whole extract.

DR. COHEN: Mallow extract.

DR. ROSS: Then there was, I believe --

DR. TILTON: Also, flower extract.

DR. ROSS: Flower extract and flower and leaf. No, just flower extract.

DR. COHEN: Okay, so we have ocular irritation on Mallow extract and flower extract.

DR. ROSS: Which could be a molecular test, not an animal test.

DR. COHEN: Right. I mean, we're just asking for -- if we ask for ocular irritation is that implicit that we could look at some in vitro data?

DR. ROSS: I think so.

DR. BERGFELD: I think so.

DR. ROSS: Maybe you tell me.

DR. COHEN: I would think so.

DR. ROSS: Yeah? Yeah.

MS. RAJ: Yeah, we've received it before.

DR. ROSS: We could accept that. It's for us to accept, right?

MS. RAJ: Yeah.

DR. TILTON: Those are validated method. Like, OECD validated methods.

MS. RAJ: We've received in vitro ocular irritation data before.

DR. ROSS: Yeah. It's hens eggs, and there's chicken eggs and isolated cell. Davide, can I -- just so I've got this straight. The irritation and sensitization on the skin, right. The flower extract, we got the Wave 2 up to ten percent. That's where you want to see the study?

DR. COHEN: Yes.

DR. ROSS: Right. Okay. Fair enough. And then the Mallow extract, itself, the maximum use is what, 0.003 percent, is that what I'm seeing?

DR. COHEN: We have for the extract -- let me look.

MS. RAJ: The maximum concentration of use is -- hold on, you said for the what extract?

DR. ROSS: Mallow extract, yeah.

DR. HELDRETH: 0.003?

DR. ROSS: 0.003 percent, I think.

DR. COHEN: So, you're saying 0.003?

DR. ROSS: 0.003, yeah.

DR. COHEN: So, you're saying that this sensitization isn't max use?

DR. ROSS: Well, I'm just saying that we have an HRIPT with the Mallow leaf stem extract which is different but it's up to 0.012 percent. But if you think they're the same, then we wouldn't have to ask for that. But I don't know if they're the same.

DR. COHEN: You know, it gets back to the point you mentioned before, do we bring it along like at one component to another. Okay, flower.

DR. ROSS: It looks like they're similar extractions.

DR. COHEN: What the flower, leaf, stem versus the extract?

DR. ROSS: Let's see. Yeah, the extract is extracted with methanol, the whole thing. Flower, leaf, stem stirred into methanol.

DR. COHEN: It's similar?

DR. ROSS: Yeah. So, that was my question, did we need to go after the Mallow extract if these two things were so similar?

DR. COHEN: Well --

DR. ROSS: And maybe that's a discussion point tomorrow.

DR. COHEN: Well, no -- but that's the point. If they're similar and one of them is used at ten times the higher concentration than the other, right, so then we still want max use. If the two are similar, and one has a max use lower than the other, and we only have HRIPT on the lower one, wouldn't we want the higher one?

DR. ROSS: Yeah, but I think we have the Mallow leaf stem extracts at 0.012 percent?

DR. COHEN: 0.0125 percent.

DR. ROSS: Oh, did I get that wrong? Is it?

DR. COHEN: I have it at 0.0125.

MS. RAJ: Yes.

DR. ROSS: Is that right?

DR. TILTON: Yes, that's right.

DR. ROSS: Oh. Then I'll be quiet.

DR. COHEN: No, no, no, no, no. It was an excellent discussion point for us to think about because it would be possible that one of the components was tested at max use to its component. The question is can we bring it along to a max use of a different component, and these are similar, so I think we could keep it as is.

DR. ROSS: There was a clinical study with 4 percent Mallow extract with non-irritating.

DR. COHEN: What was that? Can you repeat that?

DR. ROSS: There was a clinical study, I believe, with Mallow extract and 4 percent was non-irritating.

DR. COHEN: It was a therapeutic trial.

DR. ROSS: It was.

DR. COHEN: And they just don't look for the same issues. They were looking for reduction of redness, scale crusting, things like that, signs of eczema. But they're not looking for it as a toxicity endpoint.

They already have disease that they're treating. Yes, I saw them. That comes across quite a bit in these reports every now and again. They're only useful when a bunch of people have adverse effects from them.

DR. BERGFELD: But they are an attention getter for you to reexamine clinical responses.

DR. HELDRETH: Um-hmm.

DR. COHEN: Yeah. Anything else? I think we have a long list. Do you want to wait for Methyl Alcohol before or after? You want to just run Methyl Alcohol and then we'll go? The only reason I'm doing that, I'm pushing a little is because we had a very long morning lecture session, and I don't want to have the post lunch blues come through.

DR. BERGFELD: Fatigue.

Full Panel – December 6, 2022

DR. BELSITO: Okay. So, this is the first time we're looking at these eight Mallow cosmetic ingredients. And an SLR was announced in September of 2022. We received a fairly large amount of information on them initially. And then we got some additional data in Wave 2 that included data on a product called Flower Moisture. And after discussing that, we felt that was Flower Extract. So that data was used for Flower Extract.

We also received information that Flower/Leaf/Bud/Seed and Stem are all eaten, so they're foods, eliminating our needs for systemic toxicity. We got additional information on composition and impurities in Wave 2. And, as a result of all of the information we got, including an HRIPT, we felt that these were safe as used when formulated to be non-sensitizing.

DR. BERGFELD: David -- that's a motion? I'm sorry.

DR. BELSITO: Yes.

DR. COHEN: Yeah. Before we second that, we didn't have concentration for use for lip or eye products -- it's exactly what we were talking about before -- or ocular irritation on Extract and Flower Extract. Had the same question, if the material in the second wave is on Flower Extract then our needs would be met there.

DR. BERGFELD: Flower Moisture is Flower Extract, yes.

DR. COHEN: So, let's look at the --

DR. RETTIE: Yeah, I think, the eye uses were about 13?

DR. COHEN: Yeah.

DR. ROSS: And the lipstick was about 50 or so?

UNIDENTIFIED FEMALE: Yeah, 52.

DR. ROSS: 52, so significant.

DR. COHEN: It is, but we have HRIPT at 10 percent, right? Don?

DR. BELSITO: Yeah, but we're formulating to be non-sensitizing.

DR. COHEN: Yeah. Team, we have any further comments on that? Tom?

DR. SLAGA: I agree with that.

DR. BERGFELD: Are you agreeing with Don Belsito, or with whom?

DR. SLAGA: Yeah, on the non-sensitizing.

DR. BERGFELD: Okay.

DR. ROSS: None of these components are GRAS, right? You mentioned there were --

DR. BELSITO: Yes. They're all food use.

DR. ROSS: Yeah.

DR. BELSITO: Including the stem.

DR. ROSS: Okay. We didn't have that GRAS in -- I mean, you were trying to convince us with the cookies that it was GRAS, but we didn't have that information.

DR. COHEN: And Don did it without it.

DR. ROSS: Yeah.

MS. RAJ: We had a discussion yesterday about the references in the non-cosmetic sections. So, looking at them it's an EMA (phonetic) assessment, and another reference which mentions that tender leaves and stems are consumed.

DR. ROSS: So we can move those into the GRAS category as Don has said?

DR. COHEN: Yeah.

MS. RAJ: I think so.

DR. BELSITO: Yes.

DR. COHEN: We'll second Don's motion.

DR. BERGFELD: And will you repeat your motion?

DR. BELSITO: Safe as used when formulated to be non-sensitizing.

DR. BERGFELD: And any comments for the discussion?

DR. BELSITO: Yes, for the discussion, the food use, and the respiratory and botanical boilerplates.

DR. BERGFELD: Okay. I'm going to call the vote now. All those in favor of this conclusion and the needs assessment? Unanimous, thank you. Great discussion. Moving on to --

DR. KLAASSEN: One point there.

DR. BERGFELD: Yes?

DR. KLAASSEN: It is used as food; I don't think it's officially GRAS, is it?

DR. BERGFELD: I don't think so.

DR. BELSITO: No, I mean, but we've used the tradition of food use to clear systemic endpoint toxicities.

DR. KLAASSEN: Okay.

DR. BELSITO: We did have a discussion, though, that homeopathic use would not necessarily clear that.

DR. BERGFELD: Does that answer your question?

DR. KLAASSEN: Yeah, we just don't want to use the word GRAS.

DR. BELSITO: Right, exactly.

DR. BERGFELD: Yeah.

DR. KLAASSEN: That's all I was trying to emphasize.

DR. BERGFELD: Okay.

DR. COHEN: Yeah.

DR. BERGFELD: Food use.

DR. COHEN: Yeah.

DR. BERGFELD: I think that editorial can be made. Is that okay?

DR. BELSITO: Yes.

DR. BERGFELD: All right, moving on to Olive then, Dr. Cohen.

Safety Assessment of *Malva sylvestris* (Mallow) – Derived Ingredients as Used in Cosmetics

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The Expert Panel for Cosmetic Ingredient Safety members are: Chair, Wilma F. Bergfeld, M.D., F.A.C.P.; Donald V. Belsito, M.D.; David E. Cohen, M.D.; Curtis D. Klaassen, Ph.D.; Allan E. Rettie, Ph.D.; David Ross, Ph.D.; Thomas J. Slaga, Ph.D.; Paul W. Snyder, D.V.M., Ph.D.; and Susan C. Tilton, Ph.D. The Cosmetic Ingredient Review (CIR) Executive Director is Bart Heldreth, Ph.D. This safety assessment was prepared by Preethi Raj, Senior Scientific Analyst/Writer, CIR.

ABBREVIATIONS

AD	atopic dermatitis
CAS	Chemical Abstracts Service
cGMPs	current good manufacturing practices
CIR	Cosmetic Ingredient Review
CPSC	Consumer Product Safety Commission
Council	Personal Care Products Council
EASI	Eczema Area and Severity Index
FDA	Food and Drug Administration
GAE	gallic acid equivalents
GRAS	generally recognized as safe
HRIPT	human repeated insult patch test
INC	International Nomenclature Committee
MTT	3-(4,5-dimethylthiazol-2-yl)-2,5- diphenyl tetrazolium bromide
NR	not reported/none reported
OECD	Organisation for Economic Co-operation and Development
Panel	Expert Panel for Cosmetic Ingredient Safety
QE	quercetin equivalents
SCORAD	Scoring Atopic Dermatitis
TPA	12- <i>O</i> -tetradecanoylphorbol-acetate
US	United States
UVB	ultraviolet B
VCRP	Voluntary Cosmetic Registration Program
wINCI; <i>Dictionary</i>	web-based <i>International Cosmetic Ingredient Dictionary and Handbook</i>

ABSTRACT

The Expert Panel for Cosmetic Ingredient Safety (Panel) assessed the safety of 8 *Malva sylvestris* (mallow)-derived ingredients. The majority of these ingredients are reported to function in cosmetics as skin-conditioning agents; however, Malva Sylvestris (Mallow) Leaf Powder is reported to function as an exfoliant. Because final product formulations may contain multiple botanicals, each containing the same constituents of concern, formulators are advised to be aware of these constituents to avoid reaching levels that may be hazardous to consumers. With *Malva sylvestris* (mallow)-derived ingredients, the Panel was concerned about the presence of potential sensitizers (e.g., cinnamal) in cosmetics. Industry should use good manufacturing practices to minimize impurities. The Panel reviewed data relevant to the safety of these ingredients in cosmetic formulations, and concluded that these ingredients are safe in cosmetics in the present practices of use and concentration described in this safety assessment when formulated to be non-sensitizing.

INTRODUCTION

This assessment reviews the safety of 8 *Malva sylvestris* (mallow)-derived ingredients as used in cosmetic formulations:

Malva Sylvestris (Mallow) Extract	Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract
Malva Sylvestris (Mallow) Flower	Malva Sylvestris (Mallow) Leaf Extract
Malva Sylvestris (Mallow) Flower Extract	Malva Sylvestris (Mallow) Leaf Powder
Malva Sylvestris (Mallow) Flower/Leaf Extract	Malva Sylvestris (Mallow) Oil

According to the web-based *International Cosmetic Ingredient Dictionary and Handbook (wINCI; Dictionary)*, 6 of these ingredients are reported to function in cosmetics as skin-conditioning agents, and one, Malva Sylvestris (Mallow) Leaf Powder, is reported to function as an exfoliant (Table 1).¹ Malva Sylvestris (Mallow) Oil is not included in the *Dictionary*; however, it has reported uses in the 2022 US Food and Drug Administration (FDA) Voluntary Cosmetic Registration Program (VCRP) database, and is thus being reviewed herein.

As indicated in their names, all of these ingredients are derived from the same plant species, *Malva sylvestris*. *Malva sylvestris* may contain hundreds of constituents. Thus, in this assessment, the Panel is evaluating the safety of each of the *Malva sylvestris*-derived ingredients as a whole, complex substance; toxicity from single components may not predict the potential toxicity of botanical ingredients.

Some of the ingredients reviewed in this safety assessment may be consumed as food, and daily exposure from food use would result in much larger systemic exposures than those from use in cosmetic products. The primary focus of the safety assessment of these ingredients as used in cosmetics is on the potential for effects from topical exposure.

This safety assessment includes relevant published and unpublished data that are available for each endpoint that is evaluated. Published data are identified by conducting an exhaustive search of the world's literature. A listing of the search engines and websites that are used and the sources that are typically explored, as well as the endpoints that the Panel typically evaluates, is provided on the Cosmetic Ingredient Review (CIR) website (<https://www.cir-safety.org/supplementaldoc/preliminary-search-engines-and-websites>; <https://www.cir-safety.org/supplementaldoc/cir-report-format-outline>). Unpublished data are provided by the cosmetics industry, as well as by other interested parties.

The cosmetic ingredient names, according to the *Dictionary*, are written as listed above, without italics. In many of the published studies, it is not known how the substance being tested compares to the ingredient as used in cosmetics. Therefore, if it is not known whether the ingredient being discussed is a cosmetic ingredient, the test substance will be identified by the standard taxonomic practice of using italics to identify genus and species (i.e., *Malva sylvestris* extract) or by using its common name (e.g., mallow extract). However, if it is known that the substance is a cosmetic ingredient, the International Nomenclature Committee (INC) terminology (i.e. title case and no italics) “Malva Sylvestris...” (e.g., Malva Sylvestris (Mallow) Extract) will be used. When referring to the plant from which these ingredients are derived, the standard scientific practice of using italics will be followed (i.e., *Malva sylvestris*).

CHEMISTRY

Definition and Plant Identification

The definitions of 7 of the 8 *Malva sylvestris* (mallow)-derived ingredients reviewed in this assessment (Malva Sylvestris (Mallow) Oil is not in the *Dictionary*) are presented in Table 1.¹ Malva Sylvestris (Mallow) Flower Extract and Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract both have the CAS No. 84082-57-5. The remaining ingredients do not have assigned CAS numbers.

Generically, the flower is defined as the reproductive shoot in flowering plants, and is usually composed of sepals, petals, stamens, and pistil(s). The stem is defined as a slender or elongated structure, which supports a plant, fungus, or plant organ. The leaves are defined as the flattened photosynthetic organs of a plant, which are attached to the plant stems.

Malva sylvestris is a perennial herbaceous plant, native to Europe, Asia, and Northern Africa, and is colloquially known as blue or common mallow.^{2,3} The leaves are green, with rounded or acute apexes, and multiple (mostly seven) lobes. The

flowers of *Malva sylvestris* are odorless, displaying five wedge-shaped, notched petals, mauve to purple in color, with dark veins. A *Malva sylvestris* plant bears 20-35 branches with 50-75 flowers per branch, emerging from leaf axils on each node.

Chemical Properties

Malva Sylvestris (Mallow) Extract, Malva Sylvestris (Mallow) Flower Extract, Malva Sylvestris (Mallow) Flower/Leaf Extract, Malva Sylvestris (Mallow) Leaf Extract, and Malva Sylvestris (Mallow) Oil are liquids. According to a supplier, an aqueous Malva Sylvestris (Mallow) Flower/Leaf Extract as well as a hydroglycolic and aqueous Malva Sylvestris (Mallow) Leaf Extract are miscible in water and 50% v/v alcohol, and are not miscible in mineral and vegetal oils.⁴⁻⁹ A summary of chemical properties described for these *Malva sylvestris* (Mallow)-derived ingredients is provided in Table 2.

Method of Manufacture

Some of the methods of manufacture described herein were submitted by suppliers. However, others are general to the processing of *Malva sylvestris* (mallow), for which it is unknown if these apply to cosmetic ingredient manufacturing.

Malva Sylvestris (Mallow) Extract

In a method for producing a methanolic *Malva sylvestris* extract, the whole plant was chopped into small pieces, shade-dried, and ground.¹⁰ This ground plant material was extracted with methanol three times at room temperature and filtered. The filtrate was evaporated under reduced pressure to yield a dark greenish extract that was suspended in water.

Malva Sylvestris (Mallow) Flower Extract

One supplier described several methods of manufacture for Malva Sylvestris (Mallow) Flower Extract, via various solvents.¹¹ Two ethanolic Malva Sylvestris (Mallow) Flower Extracts were produced via extraction of dried *Malva sylvestris* (mallow) flowers with either 30% or 50% v/v ethanolic solution, followed by filtration (other solvents not disclosed). Another ethanolic (30% v/v) Malva Sylvestris (Mallow) Flower Extract was prepared by dissolving the extract of dried *Malva sylvestris* (mallow) flowers with 30% ethanolic solution in squalane, prior to filtration (other solvent not disclosed). A Malva Sylvestris (Mallow) Flower Extract was obtained by filtering the extract of dried *Malva sylvestris* (mallow) flowers with 50% v/v 1, 3-butylene glycolic solution (in water). Alternatively, an aqueous extract of dried *Malva sylvestris* (mallow) flowers was dissolved in 30% v/v 1,3-butylene glycolic solution prior to filtration.

Malva Sylvestris (Mallow) Flower Extract was extracted using eluents such as water, butylene glycol, carthamus tinctorius (safflower) seed oil, glycerin, and propylene glycol, to yield a concentrate.¹² This concentrate containing the phytochemical constituents is then blended with the desired diluent(s) and preservatives to produce the final ingredient.

During the production of a *Malva sylvestris* flower extract, raw *Malva sylvestris* flowers were crushed to particle size 2-6 mm.¹³ The extractions were carried out using the fractional maceration method, with solutions of 10 – 90% v/v ethanol (at room temperature) and with purified water (within 20-100 °C). The obtained extracts were combined and refined with a paper filter.

Malva Sylvestris (Mallow) Flower/Leaf Extract

According to a supplier, Malva Sylvestris (Mallow) Flower/Leaf Extract is prepared using the following method.¹⁴ Flowers and leaves of *Malva sylvestris* are extracted via steam distillation, and the resulting extract is filtered to yield Malva Sylvestris (Mallow) Flower/Leaf Extract. This ingredient is preserved with 1.5% phenoxyethanol.⁴

In another preparation of a *Malva sylvestris* (mallow) flower/leaf extract, air-dried plant flowers and leaves of *Malva sylvestris* were extracted using a soxhlet type apparatus with n-hexane, dichloromethane, and methanol, respectively.¹⁵ The extracts were then dried in a vacuum.

Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract

A fine dried powder of the flowery stem of *Malva sylvestris* was extracted by stirring with 30 ml of methanol at 25 °C at 150 rpm for 1 h, and then filtered.¹⁶ The residue was then extracted for a second time with an additional 30 ml of methanol. The combined methanolic extracts were evaporated at 35 °C under reduced pressure, re-dissolved in methanol at a concentration of 10 mg/ml, and stored at 4 °C.

Malva Sylvestris (Mallow) Leaf Extract

According to supplier-provided data, Malva Sylvestris (Mallow) Leaf Extract can be produced using various solvents. For a hydroglycolic Malva Sylvestris (Mallow) Leaf Extract, *Malva sylvestris* leaves are extracted with a mixture of propylene glycol and water, and the resulting extract is filtered to yield the final product.¹⁷ An aqueous Malva Sylvestris (Mallow) Leaf Extract is produced via steam distillation and filtration.¹⁸ This extract is preserved with 1.5% phenoxyethanol.⁶

In an alternate preparation of a *Malva sylvestris* (mallow) leaf extract, *Malva sylvestris* leaves were cleaned under shade, and ground to a fine powder.¹⁹ The powder (30 g) was then extracted with 500 ml of 50% methanol for 24 h at room temperature with magnetic stirring. The resulting extract was centrifuged at 4500 g for 10 min and lyophilized before being stored at -21 °C.

Malva Sylvestris (Mallow) Leaf Powder

During the process of making a *Malva sylvestris* (mallow) leaf powder, the green vegetable portion of *Malva sylvestris* was washed and dried in an oven at 60 °C for at least 24 h.²⁰ This dried sample was crushed into a powder prior to use in extraction.

Malva Sylvestris (Mallow) Oil

Aerial portions of the *Malva sylvestris* plant were air-dried in shade at room temperature prior to grinding to a fine powder.²¹ These three powder samples (50 g in triplicates) were extracted via hydrodistillation for 3 h, using a Clevenger-type apparatus. The resulting oils were dried over anhydrous sodium sulphate and stored in the dark.

Composition and Impurities

According to a 2018 European Medicines Agency assessment on *Malva sylvestris* L., mucilage, polysaccharides, anthocyanins, flavonoids, fatty acids, organic acids, tocopherols, phenolic derivatives, polyphenols, and terpenoids are among the constituents known to be present in the flowers and leaves of the *Malva sylvestris* plant.²²

Malva Sylvestris (Mallow) Extract

The total phenolic content in hexane, dichloromethane, methanol, and aqueous extracts of the whole *Malva sylvestris* plant was determined using the Folin-Ciocalteu assay and expressed in standard gallic acid equivalents (GAE).¹⁰ The phenolic content was 41.73, 73.31, 59.91, and 40.91, respectively. The total flavonoid content in these extracts, using rutin as a positive control, was determined to be 38.13, 69.22, 61.12, and 37.22, respectively. Both the phenolic and flavonoid content were highest for the dichloromethane extract.

Malva Sylvestris (Mallow) Flower Extract

According to a supplier, an ethanolic (50% v/v) *Malva Sylvestris* (Mallow) Flower Extract and a *Malva Sylvestris* (Mallow) Flower Extract obtained using a 1,3-butylene glycolic solution (50% v/v, in water), both comprising tannins and anthocyanins, did not contain more than 20 ppm heavy metals or more than 2 ppm arsenic.¹¹ Similarly, an ethanolic (30% v/v) *Malva Sylvestris* (Mallow) Flower Extract comprising tannins, saccharides, and anthocyanins, did not contain more than 20 ppm heavy metals or 2 ppm arsenic. A *Malva Sylvestris* (Mallow) Flower Extract, extracted in 30% ethanolic solution and dissolved in squalane, was reported to comprise essential oil whilst containing no more than 10 ppm heavy metals and 2 ppm arsenic. An aqueous *Malva Sylvestris* (Mallow) Flower Extract, dissolved in a 1,3-butylene glycolic solution (30% v/v), comprising tannins and anthocyanins, was reported to contain no more than 20 ppm heavy metals and no more than 2 ppm arsenic.

A *Malva Sylvestris* (Mallow) Flower Extract concentrate, in an alcohol base, was tested for the presence of known fragrance allergens.¹² All of the following constituents were found to be below the European Union Cosmetic Directive threshold for labelling of less than 1 ppm – 0.0001% (i.e., allergens need to be disclosed on the label if they exceed 0.001% in leave-on products and 0.01% in rinse-off products): amyl cinnamal, benzyl alcohol, cinnamyl alcohol, citral, eugenol, hydroxycitronellal, isoeugenol, amylcinnamyl alcohol, benzyl salicylate, cinnamal, hydroxyisohexyl 3-cyclohexene, carboxaldehyde, coumarin, geraniol, anise alcohol, benzyl cinnamate, farnesol, butylphenyl methylpropional, linalool, benzyl benzoate, citronellol, hexyl cinnamal, limonene, methyl 12-octynoate, and α -isomethyl inone.

Malva Sylvestris (Mallow) Flower Extract concentrate, in a glycerin and water base, was tested for the presence of impurities.¹² No residual pesticides and none of the following heavy metals were detected: antimony, arsenic, cadmium, chromium, iron, lead, mercury, and nickel.

Malva sylvestris (mallow) flowers that were extracted with 70% ethanol were evaluated for phenol and flavonoid content.²³ The extract was determined to have a total phenolic content of 6.32 ± 0.13 GAE/g, and a total flavonoid content of 1.45 ± 0.21 quercetin equivalents (QE)/g. Additionally, the composition and determination of individual constituents found in *Malva sylvestris* (mallow) flower extract, varies considerably depending on extraction solvent and method.¹³ For example, maximum polysaccharide and flavonoid content were obtained from wild mallow flowers when extracted with purified water at increased temperatures.

Malva Sylvestris (Mallow) Flower/Leaf Extract

An aqueous extract of *Malva Sylvestris* (Mallow) Flower/Leaf Extract was described by a supplier to contain $\geq 98\%$ water, 1.5% phenoxyethanol, and $\leq 0.50\%$ *Malva sylvestris* extract.²⁴ Additionally, the manufacturer of the *Malva Sylvestris* (Mallow) Flower/Leaf Extract attested that the ingredient was made in accordance with the European Cosmetic Regulation 1223/2009/EC, and that it does not contain any of the 26 allergenic substances listed in this regulation.²⁵ The manufacturer confirmed the absence of unwanted impurities and attested that this ingredient is devoid of diethylene glycol, dioxin, formaldehyde, formol, gluten, glycol ether, phthalate, and volatile organic compounds (with the exception of phenoxyethanol).

Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract

Leaves, flowers, immature fruits, and leafy flowered stems of *Malva sylvestris* plant, that were extracted in methanol, were compared for their chemical composition.¹⁶ Leaves contained the highest amounts of phenolics (386.45 mg/g of extract), flavonoids (210.81 mg/g) and carotenoids (0.19 mg/g). Flowers contained the highest amount of ascorbic acid (1.11 ± 0.07). A comparison of these constituents by plant part can be found in Table 3.

Malva Sylvestris (Mallow) Leaf Extract

A hydroglycolic Malva Sylvestris (Mallow) Leaf Extract comprises 67.6% propylene glycol, 30% water, and 2.4% Malva Sylvestris (Mallow) Leaf Extract.²⁶ An aqueous Malva Sylvestris (Mallow) Leaf Extract comprises 98% water, 1.50% phenoxyethanol, and 0.50% Malva Sylvestris (Mallow) Leaf Extract.²⁷ Additionally, the manufacturer of these Malva Sylvestris (Mallow) Leaf Extracts attested that these ingredients were made in accordance with the European Cosmetic Regulation 1223/2009/EC, and did not contain any of the 26 allergenic substances listed in this regulation, or unwanted impurities.^{28,29} Accordingly, the manufacturer attested that these ingredients are devoid of diethylene glycol, dioxin, formaldehyde, formol, gluten, glycol ether, phthalate, and volatile organic compounds (with the exception of phenoxyethanol).

In a phytochemical analysis of *Malva sylvestris* leaves, different samples contained 82.80-86.23% moisture, 13.10-14.85% ash, 0.16-0.30% fat, 2.95-5% fiber, and 2.49-3.22% protein.³⁰ Various fatty acids, including linolenic acid and palmitic acid, as well as minerals (calcium, sodium, magnesium, iron, phosphorus, zinc, and copper, in descending order by quantity) were also found in the leaves.

The total phenolic content of an aqueous *Malva sylvestris* (mallow) leaf extract was determined to be 153.02 ± 2.88 mg GAE/g.³¹ In another study, *Malva sylvestris* leaves extracted with 70% ethanol were determined to have a total phenolic content of 1.42 ± 0.14 GAE/g, and a total flavonoid content of 0.76 ± 0.19 QE/g.²³

Malva Sylvestris (Mallow) Oil

In a gas chromatography-mass spectrometry analysis of dried *Malva sylvestris* flowers, the aroma-active compounds were extracted by hydrodistillation.³² This extraction produced a light yellow oil with a sweet odor and 143 identifiable volatile compounds. The main compounds found were hexadecenoic acid (10.1%), pentacosane (4.8%), and 6,10,14-trimethyl-2-pentadecanone (4.1%). The essential oil mainly comprised hydrocarbons (25.40%), alcohols (18.78%), acids (16.66%), ethers (5.01%), ketones (7.28%), esters (12.43%), aldehydes (2.3%), and others (2%).

Phenolic compounds, carbonyl compounds, oxygenated sesquiterpenes, fatty acids and esters, and hydrocarbons were identified as the main constituent categories for oil obtained from the aerial parts of several *Malva sylvestris* plants.²¹ In another study, a few of the aroma-active compounds found in oil extracted from dry *Malva sylvestris* flowers were identified as phenanthrene (2090 µg/kg), 2,3-dihydrobenzofuran (1440 µg/kg), menthol (1030 µg/kg), borneol (620 µg/kg), and limonene (440 µg/kg).³²

USE**Cosmetic**

The safety of the cosmetic ingredients addressed in this assessment is evaluated based on data received from the US FDA and the cosmetics industry on the expected use of these ingredients in cosmetics, and does not cover their use in airbrush delivery systems. Data are submitted by the cosmetic industry via the FDA's VCRP database (frequency of use) and in response to a survey conducted by the Personal Care Products Council (Council) (maximum use concentrations). The data are provided by cosmetic product categories, based on 21CFR Part 720. For most cosmetic product categories, 21CFR Part 720 does not indicate type of application and, therefore, airbrush application is not considered. Airbrush delivery systems are within the purview of the US Consumer Product Safety Commission (CPSC), while ingredients, as used in airbrush delivery systems, are within the jurisdiction of the FDA. Airbrush delivery system use for cosmetic application has not been evaluated by the CPSC, nor has the use of cosmetic ingredients in airbrush technology been evaluated by the FDA. Moreover, no consumer habits and practices data or particle size data are publicly available to evaluate the exposure associated with this use type, thereby preempting the ability to evaluate risk or safety.

According to 2022 VCRP survey data, all of the ingredients named in this assessment are reported to be in use.³³ Malva Sylvestris (Mallow) Extract is reported to be used in 198 formulations, 184 of which are leave-on products, and Malva Sylvestris (Mallow) Flower Extract is reported to be used in 72 formulations (Table 4). The other ingredients have 5 or fewer reported uses. The results of the concentration of use survey conducted by the Council in 2022 indicate Malva Sylvestris (Mallow) Flower Extract has the highest reported maximum concentration of use at 0.1% in non-spray body and hand products and in depilatories.³⁴ Although VCRP frequency of use data were reported for all ingredients, concentration of use data were only received for Malva Sylvestris (Mallow) Extract and Malva Sylvestris (Mallow) Flower Extract.

Malva Sylvestris (Mallow) Extract is reported to be used in products that can result in incidental ingestion, such as 52 lipstick formulations (concentration of use not provided). Malva Sylvestris (Mallow) Extract and Malva Sylvestris (Mallow) Flower Extract are reported to be used in products applied near the eye, in 6 and 2 other eye makeup preparations,

respectively (concentrations of use not provided). Of note, *Malva Sylvestris* (Mallow) Flower Extract has reported uses in baby shampoo, lotions, oils, powders and creams (2 reported uses; concentrations of use not provided).

Furthermore, some of the *Malva sylvestris* (mallow)-derived ingredients are used in powder formulations, and could possibly be inhaled. For example, *Malva Sylvestris* (Mallow) Extract and *Malva Sylvestris* (Mallow) Flower Extract are reported to be used in 2 and 5 face powder formulations, respectively (concentrations of use not provided). In practice, as stated in the Panel's respiratory exposure resource document (<https://www.cir-safety.org/cir-findings>), most droplets/particles incidentally inhaled from cosmetics would be deposited in the nasopharyngeal and tracheobronchial regions and would not be respirable (i.e., they would not enter the lungs) to any appreciable amount. Conservative estimates of inhalation exposures to respirable particles during the use of loose powder cosmetic products are 400-fold to 1000-fold less than protective regulatory and guidance limits for inert airborne respirable particles in the workplace.

Although products containing some of these ingredients may be marketed for use with airbrush delivery systems, this information is not available from the VCRP or the Council survey. Without information regarding the frequency and concentrations of use of these ingredients, and without consumer habits and practices data or particle size data related to this use technology, the data are insufficient to evaluate the exposure resulting from cosmetics applied via airbrush delivery systems.

All of the ingredients named in the report are not restricted from use in any way under the rules governing cosmetic products in the European Union.³⁵

Non-Cosmetic

Malva sylvestris (mallow) leaves, flowers, seeds, stems, and buds are consumed across cultures as a traditional herb and food, with a multitude of traditional medicine uses, including as a mild laxative, anti-inflammatory agent, a liver cleansing tonic, and prophylactic against heartburn.³⁶ Due to its high mucilage content, mallow traditionally is used to treat oral or pharyngeal irritations and gastrointestinal discomfort.²²

TOXICOKINETIC STUDIES

No relevant toxicokinetic studies were found in the published literature, and unpublished data were not submitted. In general, toxicokinetic data are not expected to be found on botanical ingredients because each botanical ingredient is a complex mixture of constituents.

TOXICOLOGICAL STUDIES

Acute Toxicity Studies

No acute toxicity studies were found in the published literature, and unpublished data were not submitted.

Short-Term Toxicity Studies

Malva Sylvestris (Mallow) Leaf Extract

The effects of a *Malva sylvestris* (mallow) leaf extract upon male Wistar rat heart and testes were evaluated.¹⁹ Six male Wistar rats were orally administered 0.2 g/kg bw *Malva sylvestris* (mallow) leaf extract for 60 d, during which the animals received an intraperitoneal (i.p.) injection of distilled water (0.5 ml/100 g bw) for the last 30 d of treatment. No significant changes were seen in the weights of the testis, genital tract (seminal vesicles, epididymis, prostate), or heart of rats treated with the leaf extract. Normal cellular morphology of seminiferous tubules and lumen with mature spermatozoa were seen in the testes, and myocardial sections of rats treated with the *Malva sylvestris* (mallow) leaf extract showed slightly separated myocardial fibers with small focus of inflammatory mononuclear collections with the absence of necrotic damage.

DEVELOPMENTAL AND REPRODUCTIVE TOXICITY STUDIES

A short-term toxicity study of a *Malva sylvestris* (mallow) leaf extract (described previously) examined the effects on the testes and genital tract of male rats.¹⁹ (See the Short-Term Toxicity section for results.) No full developmental or reproductive toxicity studies were found in the published literature, and unpublished data were not submitted.

GENOTOXICITY STUDIES

Malva Sylvestris (Mallow) Flower Extract

A *Malva Sylvestris* (Mallow) Flower Extract (extracted with 50% v/v 1,3-butylene glycolic solution, in water) was not genotoxic when tested at concentrations up to 10,000 µg/0.1 ml/plate in *Salmonella typhimurium* TA98, TA100, TA1535, TA1537, and *Escherichia coli* WP2 uvrA strains in an Ames test.¹¹ No further details were provided. Another *Malva Sylvestris* (Mallow) Flower Extract (aqueous, further dissolved in 30% v/v 1,3-butylene glycolic solution) was also not genotoxic when tested in the same *S. typhimurium* and *E. coli* strains at concentrations up to 5000 µg/0.1 ml/plate. No further details were provided.

CARCINOGENICITY STUDIES

No carcinogenicity studies were found in the published literature, and unpublished data were not submitted.

OTHER RELEVANT STUDIES

Cytotoxicity

Malva Sylvestris (Mallow) Leaf Extract

The cytotoxic potential of a methanolic *Malva sylvestris* (mallow) leaf extract against melanoma and lymphoma cell lines was evaluated in a 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay.³⁷ The extract was tested at concentrations of 10, 50, 100, 150, or 200 µg/ml in both cell lines. The cytotoxic effect increased in a concentration-dependent manner; the extract was cytotoxic to melanoma at a higher rate (76.53%) than lymphoma (68.65%) at the maximum test concentration (200 µg/ml) of the extract. Also, a minimal cytotoxic effect (7%) was observed against the normal cell line at the same concentration.

Photoprotective Effects

Malva Sylvestris (Mallow) Extract

Groups of 5 male and 5 female albino BALB/c mice were used in an experiment to determine the photoprotective potential of orally ingested and topically applied *Malva sylvestris* (mallow) extract upon ultraviolet B (UVB) radiation on mice skin.³⁸ The animals were divided into 4 groups: (1) a control group which was neither exposed to UVB irradiation nor the *Malva sylvestris* (mallow) extract, (2) a group which was exposed to UVB irradiation only, (3) a group which was orally administered 1 ml of *Malva sylvestris* (mallow) extract before UVB irradiation, (4) and a group which had the *Malva sylvestris* (mallow) extract applied dermally 5 min prior to irradiation with UVB light (further details not provided). With the exception of the controls, all groups were exposed to UVB irradiation for 20 min, 4 d/wk, for a month, on shaved back skin (2 x 5 cm). UVB irradiation was shown to create changes in the epidermis, including keratinocyte proliferation, leading to epidermal thickness, which was most evident in the UVB-irradiation-only group (group 2). Compared to group 2, epidermal thickness was slight to mild-moderate for the groups which were either orally or topically administered the *Malva sylvestris* (mallow) extract. While the epidermal thickness (measured in µm) for group 2 was 12.93 times greater than in controls, the epidermal thickness for group 3 (oral exposure of *Malva sylvestris* (mallow) extract) was 3.75 times that of controls. Furthermore, the oral administration of *Malva sylvestris* (mallow) extract, as well as topical administration (topical-specific results not provided) was shown to significantly decrease the inflammatory cell infiltration associated with UVB irradiation.

Topical Anti-Inflammatory Effects

Malva Sylvestris (Mallow) Leaf Extract

The ability of a hydroalcoholic *Malva sylvestris* (mallow) leaf extract to reduce 12-*O*-tetradecanoylphorbol-acetate (TPA) – induced inflammation was examined in female Swiss mice (number not specified).³⁹ Edema was induced on the right ears of the mice by topically applying 2.5 µg/ear of TPA dissolved in 20 µl of acetone. Shortly after inducing inflammation, hydroalcoholic extract of *Malva sylvestris* leaves (0.001-3.0 mg/ear), or other compounds, such as malvidin 3,5-glucoside (0.0004–0.1 µmol/ear), malvidin 3-glucoside (0.0002–0.2 µmol/ear), scopoletin (0.0001–1.5 µmol/ear), quercetin (0.003– 3.3 µmol/ear) and dexamethasone (0.05 mg/ear, used as a positive control) were dissolved in 20 µl and applied directly on the induction site. Thickness of the ears was measured before and 6 h after induction of inflammation. The edema reduction caused by the hydroalcoholic extract was 77 ± 6% (3 mg/ear), compared to that of malvidin 3-glucoside (90 ± 3%; 0.2 µmol/ear), and quercetin (55 ± 2%; 3.3 µmol/ear).

DERMAL IRRITATION AND SENSITIZATION STUDIES

Irritation

Animal

Malva Sylvestris (Mallow) Flower Extract

A Malva Sylvestris (Mallow) Flower Extract (extracted with 50% v/v 1,3-butylene glycolic solution, in water) was not irritating when tested at 10% and 100% in a primary skin irritation test using 3 rabbits.¹¹ No further details were provided.

Human

Malva Sylvestris (Mallow) Flower Extract

A Malva Sylvestris (Mallow) Flower Extract (aqueous, further dissolved in 30% v/v 1,3-butylene glycolic solution) was non-irritating when tested at 10% in a closed patch test using 34 subjects.¹¹ No further details were provided.

Sensitization

Human

Malva Sylvestris (Mallow) Flower Extract

The sensitizing potential of a Malva Sylvestris (Mallow) Flower Extract (aqueous, further dissolved in 30% v/v 1,3-butylene glycolic solution) was evaluated at 10% in a modified Marzulli-Maibach human repeated insult patch test (HRIPT) using 54 subjects.¹¹ The ingredient was described as a mild material which did not induce delayed contact sensitization. No further details were provided.

Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract

The dermal irritation and sensitization potential of a product containing 0.0125% Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract was evaluated in an HRIPT using 101 subjects.⁴⁰ Nine occlusive induction applications of 20 µl were applied to the back under Finn chambers over 3 wk. After a 2-wk non-treatment period, a 48-h occlusive challenge application was made to the original test site and to a new test site on the opposite side of the back. Test sites were evaluated 30 min and 48 and 96 h after application. One adverse event was reported, which was unrelated to the test article. The test article was determined to not be a dermal irritant or sensitizer.

Photosensitization/Phototoxicity

Animal

Malva Sylvestris (Mallow) Flower Extract

A Malva Sylvestris (Mallow) Flower Extract (aqueous, further dissolved in 30% v/v 1,3-butylene glycolic solution) was not phototoxic to the skin of guinea pigs (n = 5) when tested at 1 and 10%.¹¹ No further details were provided. Similarly, the same extract was not photosensitizing to guinea pigs (n = 5) when tested at 10% during induction and at 1 and 10% during challenge. No further details were provided.

OCULAR IRRITATION STUDIES

No ocular irritation studies were found in the published literature, and unpublished data were not submitted.

CLINICAL STUDIES

Treatment of Atopic Dermatitis

Malva Sylvestris (Mallow) Flower Extract

In a double-blind randomized clinical trial, the efficacy of a topical cream containing a *Malva sylvestris* (mallow) flower extract to manage atopic dermatitis (AD) in pediatric patients was evaluated.⁴¹ Fifty-one children with AD were randomized to either be treated with a single fingertip unit, twice a day, of a topical cream containing a *Malva sylvestris* (mallow) flower extract or a cream base placebo, for 4 wk. Both creams were instructed to be applied as to completely cover lesions. No adverse events occurred in either study group. The primary measured outcome of this study was the severity of AD as assessed using the SCORing Atopic Dermatitis (SCORAD) questionnaire, which was filled out by the study investigator biweekly. SCORAD scores were based on 3 aspects of AD: redness, skin thickening, and crusting. A significant reduction of the severity of dermatitis was seen in the *Malva sylvestris* cream group, regarding the mean difference scores and the SCORAD total scores compared with the baseline after 2 and 4 wk of treatment. Additionally, there was a significant improvement in the skin thickening score, redness score and total SCORAD score for the *Malva sylvestris* cream group, when compared with the placebo group.

Treatment of Hand Eczema

Malva Sylvestris (Mallow) Extract

The safety and effectiveness of *Malva sylvestris* as an herbal alternative to corticosteroids and anti-histamines for the treatment of hand eczema was evaluated in a randomized clinical trial.⁴² (Details on the plant part used to make the ointment were not provided.) Fifty subjects with hand eczema were randomized to either receive a single finger tip unit, twice daily (for both hands, everyday), of an ointment containing 4% *Malva sylvestris* or the same amount of a placebo for 6 wk. Therapeutic results for erythema, excoriation, lichenification, edema, dryness, itching, and oozing were compared between the two groups 3 and 6 wk after beginning of treatment. Erythema, excoriation, and lichenification were assessed using the Eczema Area and Severity Index (EASI) scoring system; edema, dryness, itching, and oozing were also scored similarly. There was a statistically significant difference between both groups for all measured scores at the first and second follow-up. No therapeutic adverse effects were seen in either group.

SUMMARY

According to the *Dictionary*, 6 of these 8 ingredients are reported to function as skin-conditioning agents and one ingredient, Malva Sylvestris (Mallow) Leaf Powder, is reported to be an exfoliant. Malva Sylvestris (Mallow) Oil is not included in the *Dictionary*; however, it has reported uses in the 2022 VCRP database, and is thus being reviewed herein.

Malva Sylvestris (Mallow) Extract is reported to have the greatest frequency of use in 198 formulations, 184 of which are leave-on formulations. The highest reported concentration of use amongst these ingredients is for Malva Sylvestris (Mallow) Flower Extract at 0.1% in non-spray body and hand products and in depilatories. It should be noted that all ingredients have use reported in the VCRP, but concentration of use data were only reported for 2 ingredients.

Six male Wistar rats were orally administered 0.2 g/kg bw *Malva sylvestris* (mallow) leaf extract for 60 d, with an i.p. dose of 0.5 ml/100 g bw distilled water for the last 30 d of treatment. No significant changes in the weights or cellular morphology of rat testes, genital tract, or heart were observed.

In an Ames test, a *Malva Sylvestris* (Mallow) Flower Extract, obtained via extraction with 50% v/v 1,3-butylene glycolic solution, in water, was not genotoxic when tested at concentrations of up to 10,000 µg/0.1 ml/plate in *S. typhimurium* TA98, TA100, TA1535, TA1537 and *E. coli* WP2 uvrA strains. Similarly, an aqueous *Malva Sylvestris* (Mallow) Flower Extract, further dissolved in 30% v/v 1,3-butylene glycolic solution, was not genotoxic when tested at concentrations of up to 5000 µg/0.1 ml/ plate in another Ames test using the same bacterial strains.

A methanolic extract of *Malva sylvestris* (mallow) leaf extract was cytotoxic when tested at concentrations of 10, 50, 100, 150, 200 µg/ml against melanoma and lymphoma cell lines in an MTT assay. The extract was cytotoxic in a dose-dependent manner and showed a higher rate of cytotoxicity against the melanoma cell line (76.53%) than the lymphoma cell line (68.65%).

Groups of 5 male and 5 female albino BALB/c mice were exposed to UVB-irradiation, in the presence and absence of orally administered (1 ml) or dermally applied *Malva sylvestris* (mallow) extract. The epidermal changes, skin thickness, and inflammatory response caused by UVB irradiation were especially reduced by oral and topical administration of the *Malva sylvestris* (mallow) extract.

Malva sylvestris (mallow) leaf extract was applied, along with other compounds, to female mouse ears after inducing topical inflammation with TPA. Edema reduction caused by the hydroalcoholic *Malva sylvestris* (mallow) extract was $77 \pm 6\%$ (3 mg/ear), compared to that of malvidin 3-glucoside ($90 \pm 3\%$; 0.2 µmol/ear), and quercetin ($55 \pm 2\%$; 3.3 µmol/ear).

A *Malva Sylvestris* (Mallow) Flower Extract (extracted with 50% v/v 1,3-butylene glycolic solution, in water) was not irritating when tested at 10 and 100% in a primary skin irritation test using 3 rabbits. A *Malva Sylvestris* (Mallow) Flower Extract (aqueous, further dissolved in 30% v/v 1,3-butylene glycolic solution) was non-irritating at 10% in a closed patch test using 34 subjects, and non-irritating and non-sensitizing when tested at 10% in a modified Marzulli-Maibach HRIPT using 54 subjects. A product containing 0.0125% *Malva Sylvestris* (Mallow) Flower/Leaf/Stem Extract was not irritating or sensitizing in an HRIPT of 101 subjects. One adverse event was reported, which was deemed unrelated to the test article.

A *Malva Sylvestris* (Mallow) Flower Extract (aqueous, further dissolved in 30% v/v 1,3-butylene glycolic solution) was not phototoxic to guinea pig skin when tested at 1 and 10%. The same extract was also not photosensitizing to guinea pig skin when tested at 10% during induction and at 1 and 10% during challenge.

In a double-blind, randomized clinical trial, the efficacy of a topical cream containing *Malva sylvestris* extract to manage AD was evaluated in 51 pediatric patients for 4 wk. A significant reduction of the severity of dermatitis was seen in the *Malva sylvestris* cream group, regarding the mean difference scores and the SCORAD total scores compared with the baseline after 2 and 4 wk of treatment. Additionally, there was a significant improvement in the skin thickening score, redness score and total SCORAD score for the *Malva sylvestris* cream group, when compared with the placebo group.

An ointment containing 4% *Malva sylvestris* was tested as an herbal alternative to corticosteroids and anti-histamines in a randomized clinical trial of 50 subjects. Erythema, excoriation, and lichenification were assessed using the EASI scoring system; edema, dryness, itching, and oozing were also scored similarly. There was a statistically significant difference between both groups for all measured scores at the first and second follow-up. No therapeutic adverse effects were seen in either group.

DISCUSSION

The Panel reviewed the safety of 8 *Malva sylvestris* (mallow)-derived ingredients, and concluded that the available data are sufficient for determining that all 8 ingredients are safe in cosmetics in the present practices of use and concentration when formulated to be non-sensitizing. The Panel acknowledged the absence of systemic toxicity data, but noted that *Malva sylvestris* (mallow) leaves, flowers, seeds, stems, and buds are consumed as food. Accordingly, these food exposures would likely result in much larger systemic exposure compared to that resulting from use in cosmetic products, mitigating the need for systemic toxicity data.

Malva sylvestris (mallow)-derived ingredients are used (or assumed to be used) at low concentrations in cosmetic formulations. Additionally, *Malva Sylvestris* (Mallow) Flower Extract and *Malva Sylvestris* (Mallow) Flower/Leaf/Stem Extract were not irritating or sensitizing in HRIPTs. However, because final product formulations may contain multiple botanicals, each possibly containing the same constituents of concern, formulators are advised to be aware of these constituents and to avoid reaching levels that may be hazardous to consumers. For *Malva sylvestris* (mallow)-derived ingredients, the Panel was concerned about the presence of cinnamal in cosmetics, which could result in sensitization. Therefore, when formulating products, manufacturers should avoid reaching levels of plant constituents that may cause sensitization or other adverse health effects.

The Panel also expressed concern about pesticide residues, heavy metals, and other plant species that may be present in botanical ingredients. They stressed that the cosmetics industry should continue to use current good manufacturing practices (cGMPs) to limit impurities.

The Panel discussed the issue of incidental inhalation exposure resulting from these ingredients (e.g., *Malva Sylvestris* (Mallow) Extract and *Malva Sylvestris* (Mallow) Flower Extract are reported to be used face powder formulations

(concentrations of use not provided)). Inhalation toxicity data were not available. However, the Panel noted that the majority of droplets/particles would not be respirable to any appreciable amount. Furthermore, droplets/particles deposited in the nasopharyngeal or tracheobronchial regions of the respiratory tract present no toxicological concerns based on the chemical and biological properties of these ingredients. Coupled with the small actual exposure in the breathing zone and the low concentrations at which these ingredients are used (or expected to be used) in potentially inhaled products, the available information indicates that incidental inhalation would not be a significant route of exposure that might lead to local respiratory or systemic effects. A detailed discussion and summary of the Panel's approach to evaluating incidental inhalation exposures to ingredients in cosmetic products is available at <https://www.cir-safety.org/cir-findings>.

The Panel's respiratory exposure resource document (see link above) notes that airbrush technology presents a potential safety concern, and that no data are available for consumer habits and practices thereof. As a result of deficiencies in these critical data needs, the safety of cosmetic ingredients applied by airbrush delivery systems cannot be determined by the Panel. Therefore, the Panel has concluded the data are insufficient to support the safe use of cosmetic ingredients applied via an airbrush delivery system.

CONCLUSION

The Expert Panel for Cosmetic Ingredient Safety concluded that the following 8 *Malva sylvestris* (mallow)-derived ingredients are safe in cosmetics in the present practices of use and concentration described in this safety assessment when formulated to be non-sensitizing:

Malva Sylvestris (Mallow) Extract

Malva Sylvestris (Mallow) Flower

Malva Sylvestris (Mallow) Flower Extract

Malva Sylvestris (Mallow) Flower/Leaf Extract

Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract

Malva Sylvestris (Mallow) Leaf Extract

Malva Sylvestris (Mallow) Leaf Powder

Malva Sylvestris (Mallow) Oil

TABLES**Table 1. Definitions and functions of *Malva sylvestris* (mallow) – derived ingredients^{1*}**

Ingredient/CAS No.	Definition	Function
Malva Sylvestris (Mallow) Extract	Malva Sylvestris (Mallow) Extract is the extract of the whole plant, <i>Malva sylvestris</i> .	Skin-conditioning agents-miscellaneous
Malva Sylvestris (Mallow) Flower	Malva Sylvestris (Mallow) Flower is the flowers of <i>Malva sylvestris</i> .	Skin-conditioning agents-miscellaneous
Malva Sylvestris (Mallow) Flower Extract 84082-57-5	Malva Sylvestris (Mallow) Flower Extract is the extract of the flowers of <i>Malva sylvestris</i> .	Skin-conditioning agents-miscellaneous
Malva Sylvestris (Mallow) Flower/Leaf Extract	Malva Sylvestris (Mallow) Flower/Leaf Extract is the extract of the flowers and leaves of <i>Malva sylvestris</i> .	Skin-conditioning agents-miscellaneous
Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract 84082-57-5	Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract is the extract of the flowers, leaves, and stems of <i>Malva sylvestris</i> .	Skin-conditioning agents-miscellaneous
Malva Sylvestris (Mallow) Leaf Extract	Malva Sylvestris (Mallow) Leaf Extract is the extract of the leaves of <i>Malva sylvestris</i> .	Skin-conditioning agents-miscellaneous
Malva Sylvestris (Mallow) Leaf Powder	Malva Sylvestris (Mallow) Leaf Powder is the powder obtained from the dried, ground leaves of <i>Malva sylvestris</i> .	Exfoliants

*Malva Sylvestris (Mallow) Oil is not included in this table because it is not an INCI ingredient

Table 2. Chemical properties of *Malva sylvestris* (mallow)-derived ingredients

Property	Value	Reference
Mallow Sylvestris (Mallow) Extract		
Physical Form	liquid	10
Color	dark green	10
Malva Sylvestris (Mallow) Flower Extract (in glycerin and water)		
Physical Form	liquid	12
Color	medium to dark amber	12
Odor	characteristic	12
Density (@ 25 °C)	1.05 – 1.15	12
pH (@ 25°C)	4 – 6.5	12
Refractive Index (@ 25 °C)	1.3992 – 1.5	12
Solubility	Soluble in any proportion of water	12
Malva Sylvestris (Mallow) Flower/Leaf Extract (aqueous extract)		
Physical Form	liquid	4,7
Color	transparent	4,7
Odor	characteristic	4,7
Density (@ 20 °C)	0.999 – 1.002	4,7
pH (°C not specified)	4.7 – 6.7	4,7
Refractive index (@ 20°C)	1.332 – 1.339	4
Solubility (10% diluted)		4,7
<i>Miscible</i>	water, 50% v/v alcohol, propylene glycol	
<i>Nonmiscible</i>	mineral oils, vegetal oils	
Malva Sylvestris (Mallow) Leaf Extract (hydroglycolic extract)		
Physical Form	liquid, with possibly a slight precipitate	5,8
Color	brown to yellow brown; translucent	5,8
Odor	characteristic	5,8
Density (@ 20 °C)	1.047 – 1.060	5,8
Flash point (° C)	≥ 100	5,8
pH (C° not specified)	4.6- 5.7	5,8
Refractive index (@ 20 °C)	1.410 – 1.420	5
Solubility (10% diluted)		5,8
<i>Miscible</i>	water, 50% v/v alcohol	
<i>Nonmiscible</i>	mineral oils, vegetal oils	
Malva Sylvestris (Mallow) Leaf Extract (aqueous extract)		
Physical Form	liquid	6,9
Color	colorless, transparent	6,9
Odor	characteristic	6,9
Density (@ 20 °C)	0.999 – 1.002	6,9
pH (°C not specified)	5.2 – 7.2	6,9
Refractive index (@ 20 °C)	1.332 – 1.339	6
Solubility (10% diluted)		6,9
<i>Miscible</i>	water, 50% v/v alcohol, propylene glycol	
<i>Nonmiscible</i>	mineral oils, vegetal oils	

Table 2. Chemical properties of *Malva sylvestris* (mallow)-derived ingredients

Property	Value	Reference
Malva Sylvestris (Mallow) Oil		
Physical Form	liquid	32
Color	light yellow	32
Odor	sweet	32

Table 3. Constituents across various parts of the *Malva sylvestris* plant (mg/g methanolic extract)¹⁶

	Leaves	Flowers	Immature fruits	Leafy flowered stems
Phenolics	386.45 ± 8.54	258.65 ± 26.04	56.76 ± 2.01	317.93 ± 2.61
Flavonoids	210.81 ± 7.99	46.55 ± 5.26	25.35 ± 2.72	143.40 ± 7.86
Ascorbic Acid	0.17 ± 0.05	1.11 ± 0.07	0.27 ± 0.00	0.20 ± 0.04
Carotenoids	0.19 ± 0.00	0.03 ± 0.00	0.01 ± 0.00	0.11 ± 0.00

Table 4. Frequency (2022)³³ and concentration (2022)³⁴ of use according to likely duration and exposure and by product category

	# of Uses	Max Conc of Use (%)	# of Uses	Max Conc of Use (%)	# of Uses	Max Conc of Use (%)
	Malva Sylvestris (Mallow) Extract		Malva Sylvestris (Mallow) Flower		Malva Sylvestris (Mallow) Flower Extract	
Totals	198	0.0002 – 0.003	1	NR	72	0.00012 – 0.1
summarized by likely duration and exposure*						
Duration of Use						
Leave-On	184	0.003	NR	NR	43	0.005 – 0.1
Rinse-Off	10	0.0002	NR	NR	28	0.00012 – 0.1
Diluted for (Bath) Use	4	NR	1	NR	1	0.002
Exposure Type**						
Eye Area	13	NR	NR	NR	2	NR
Incidental Ingestion	52	NR	NR	NR	NR	NR
Incidental Inhalation-Spray	40 ^a ; 35 ^b	NR	NR	NR	12 ^a ; 13 ^b	NR
Incidental Inhalation-Powder	2; 35 ^b	0.003 ^c	NR	NR	6; 13 ^b ; 1 ^c	0.02 – 0.1 ^c
Dermal Contact	145	0.0002 – 0.003	1	NR	53	0.002 – 0.1
Deodorant (underarm)	NR	NR	NR	NR	1 ^a	NR
Hair - Non-Coloring	1	NR	NR	NR	19	NR
Hair-Coloring	NR	NR	NR	NR	NR	0.00012
Nail	NR	NR	NR	NR	NR	NR
Mucous Membrane	58	NR	1	NR	2	0.002
Baby Products	NR	NR	NR	NR	2	NR
as reported by product category						
Baby Products						
Baby Shampoos					1	NR
Baby Lotions/Oils/Powders/Creams					1	NR
Bath Preparations (diluted for use)						
Bath Oils, Tablets, and Salts	4	NR	1	NR		
Bubble Baths					1	0.002
Eye Makeup Preparations						
Eyebrow Pencil	4	NR				
Eye Lotion	3	NR				
Eye Makeup Remover						
Other Eye Makeup Preparations	6	NR			2	NR
Hair Preparations (non-coloring)						
Hair Conditioner					2	NR
Shampoos (non-coloring)	1	NR			8	NR
Tonics, Dressings, and Other Hair Grooming Aids					4	NR
Wave Sets					1	NR
Other Hair Preparations					3	NR
Hair Coloring Preparations						
Hair Dyes and Colors (all types requiring caution statements and patch tests)					NR	0.00012
Hair Shampoos (coloring)						
Makeup Preparations						
Blushers (all types)					1	NR
Face Powders	2	NR			5	NR
Foundations	1	NR			2	0.02
Lipstick	52	NR				
Makeup Bases	1	NR				
Makeup Fixatives	1	NR				
Other Makeup Preparations	6	NR				
Personal Cleanliness Products						
Bath Soaps and Detergents					1	NR
Deodorants (underarm)					1	NR
Other Personal Cleanliness Products	2	NR				
Shaving Preparations						
Mens Talcum					1	NR
Skin Care Preparations						
Cleansing	3	0.0002			12	0.02
Depilatories					NR	0.1
Face and Neck (exc shave)	33	0.003 (not spray)			8	0.04 (not spray)
Body and Hand (exc shave)	2	NR			5	0.02-0.1 (not spray)
Moisturizing	33	NR			6	0.03 (not spray)
Night	6	NR			1	0.03 (not spray)
Paste Masks (mud packs)	4	NR			3	NR
Skin Fresheners	1	NR			1	NR
Other Skin Care Preparations	33	NR			2	0.005

Table 4. Frequency (2022)³³ and concentration (2022)³⁴ of use according to likely duration and exposure and by product category

	# of Uses	Max Conc of Use (%)	# of Uses	Max Conc of Use (%)	# of Uses	Max Conc of Use (%)
	Malva Sylvestris (Mallow) Flower/Leaf Extract		Malva Sylvestris (Mallow) Flower/Leaf/Stem Extract		Malva Sylvestris (Mallow) Leaf Extract	
Totals	4	NR	5	NR	4	NR
summarized by likely duration and exposure*						
Duration of Use						
<i>Leave-On</i>	4	NR	4	NR	4	NR
<i>Rinse-Off</i>	NR	NR	1	NR	NR	NR
<i>Diluted for (Bath) Use</i>	NR	NR	NR	NR	NR	NR
Exposure Type**						
Eye Area	1	NR	NR	NR	NR	NR
Incidental Ingestion	NR	NR	NR	NR	NR	NR
Incidental Inhalation-Spray	1 ^a ; 2 ^b	NR	3 ^a	NR	2 ^b	NR
Incidental Inhalation-Powder	2 ^b	NR	NR	NR	2 ^b	NR
Dermal Contact	3	NR	4	NR	4	NR
Deodorant (underarm)	NR	NR	NR	NR	1 ^a	NR
Hair - Non-Coloring	1	NR	1	NR	NR	NR
Hair-Coloring	NR	NR	NR	NR	NR	NR
Nail	NR	NR	NR	NR	NR	NR
Mucous Membrane	NR	NR	NR	NR	NR	NR
Baby Products	NR	NR	NR	NR	NR	NR
as reported by product category						
Baby Products						
Baby Shampoos						
Baby Lotions/Oils/Powders/Creams						
Bath Preparations (diluted for use)						
Bath Oils, Tablets, and Salts						
Bubble Baths						
Eye Makeup Preparations						
Eyebrow Pencil						
Eye Lotion	1	NR				
Eye Makeup Remover						
Other Eye Makeup Preparations						
Hair Preparations (non-coloring)						
Hair Conditioner			1	NR		
Shampoos (non-coloring)						
Tonics, Dressings, and Other Hair Grooming Aids	1	NR				
Wave Sets						
Other Hair Preparations						
Hair Coloring Preparations						
Hair Dyes and Colors (all types requiring caution statements and patch tests)						
Hair Shampoos (coloring)						
Makeup Preparations						
Blushers (all types)			1	NR		
Face Powders						
Foundations						
Lipstick						
Makeup Bases						
Makeup Fixatives						
Other Makeup Preparations						
Personal Cleanliness Products						
Bath Soaps and Detergents						
Deodorants (underarm)					1	NR
Other Personal Cleanliness Products						
Shaving Preparations						
Mens Talcum						
Skin Care Preparations						
Cleansing						
Depilatories						
Face and Neck (exc shave)	2	NR			1	NR
Body and Hand (exc shave)					1	NR
Moisturizing			2	NR		
Night						
Paste Masks (mud packs)			1	NR		
Skin Fresheners						
Other Skin Care Preparations					1	NR

Table 4. Frequency (2022)³³ and concentration (2022)³⁴ of use according to likely duration and exposure and by product category

	# of Uses	Max Conc of Use (%)	# of Uses	Max Conc of Use (%)	# of Uses	Max Conc of Use (%)
	Malva Sylvestris (Mallow) Leaf Powder		Malva Sylvestris (Mallow) Oil			
Totals	1	NR	2	NR		
summarized by likely duration and exposure*						
Duration of Use						
Leave-On	NR	NR	NR	NR		
Rinse-Off	1	NR	2	NR		
Diluted for (Bath) Use	NR	NR	NR	NR		
Exposure Type**						
Eye Area	NR	NR	NR	NR		
Incidental Ingestion	NR	NR	NR	NR		
Incidental Inhalation-Spray	NR	NR	NR	NR		
Incidental Inhalation-Powder	NR	NR	NR	NR		
Dermal Contact	NR	NR	2	NR		
Deodorant (underarm)	NR	NR	NR	NR		
Hair - Non-Coloring	NR	NR	NR	NR		
Hair-Coloring	1	NR	NR	NR		
Nail	NR	NR	NR	NR		
Mucous Membrane	NR	NR	2	NR		
Baby Products	NR	NR	NR	NR		
as reported by product category						
Baby Products						
Baby Shampoos						
Baby Lotions/Oils/Powders/Creams						
Bath Preparations (diluted for use)						
Bath Oils, Tablets, and Salts						
Bubble Baths						
Eye Makeup Preparations						
Eyebrow Pencil						
Eye Lotion						
Eye Makeup Remover						
Other Eye Makeup Preparations						
Hair Preparations (non-coloring)						
Hair Conditioner						
Shampoos (non-coloring)						
Tonics, Dressings, and Other Hair Grooming Aids						
Wave Sets						
Other Hair Preparations						
Hair Coloring Preparations						
Hair Dyes and Colors (all types requiring caution statements and patch tests)						
Hair Shampoos (coloring)	1	NR				
Makeup Preparations						
Blushers (all types)						
Face Powders						
Foundations						
Lipstick						
Makeup Bases						
Makeup Fixatives						
Other Makeup Preparations						
Personal Cleanliness Products						
Bath Soaps and Detergents			2	NR		
Deodorants (underarm)						
Other Personal Cleanliness Products						
Shaving Preparations						
Mens Talcum						
Skin Care Preparations						
Cleansing						
Depilatories						
Face and Neck (exc shave)						
Body and Hand (exc shave)						
Moisturizing						
Night						
Paste Masks (mud packs)						
Skin Fresheners						
Other Skin Care Preparations						

NR – not reported

*likely duration and exposure is derived based on product category (see Use Categorization <https://www.cir-safety.org/cir-findings>)

**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.

ª It is possible these products are sprays, but it is not specified whether the reported uses are sprays.

- ^b Not specified whether a spray or a powder, but it is possible the use can be as a spray or a powder, therefore the information is captured in both categories
- ^c It is possible these products are powders, but it is not specified whether the reported uses are powders.

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