

**Allergenic Potential of Three Wen Cleansing Conditioners:**

**Sweet Almond Mint, Lavender, and Pomegranate**

Report prepared by [REDACTED] MD MS

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## **Allergenic Potential of Three Wen Cleansing Conditioners**

### **Objective:**

The objective of this report is to summarize the allergenic potential of ingredients in three Wen Cleansing Conditioners (Sweet Almond Mint, Lavender, and Pomegranate).

### **Methods:**

Ingredients were sorted by alphabetical order. For each ingredient, the following was summarized: 1) presence in each of the 3 Wen cleansing conditioners; 2) a brief description (origin, function, allergen category); 3) results of a literature search using the term + “contact dermatitis” or “dermatitis” or “allergy”; 4) my 20-year personal experience of patch testing with the ingredient; and 5) the number and percentage of hair products containing this allergen (or allergen category) in the American Contact Dermatitis Society (ACDS) Contact Allergen Management Plan (CAMP); CAMP products are not necessarily representative of the market but are a verifiable source of ingredients for widely-available and relatively low-allergen products.

### **Executive Summary:**

#### **Ingredients:**

There were 33 potential ingredients in the three Wen Cleansing Conditioners. These are summarized in Table 1. There were 18 ingredients in all three Wen Cleansing Conditioners. These included aloe, amodimethicone, behentrimonium methosulfate, Calendula (marigold), cetearyl alcohol, cetyl alcohol, Chamomile, citric acid, glycerin, menthol, methylchloroisothiazolinone, methylisothiazolinone, panthenol, PEG-60 almond glycerides, polysorbate-60, Rosemary, stearamidopropyl dimethylamine, and water. There was one ingredient present only in the sweet almond mint cleanser but not the other cleansers (sweet almond oil). There were 7 ingredients present in only the lavender cleanser but not the other cleansers (cucumber, dicetyldimonium chloride, guar hydroxypropyltrimonium chloride, witch hazel, lavender extract, lavender oil, and avocado oil). There were 3 ingredients present only in the pomegranate cleanser but not the other cleansers (hydrolyzed soy protein, pomegranate extract, and EDTA). The remaining 4 ingredients were found in two of the three cleansers (fragrance – sweet almond mint and pomegranate; hydrolyzed wheat protein – sweet almond mint and lavender; wild cherry – sweet almond mint and pomegranate; wheat starch- sweet almond mint and lavender).

Table 1: Ingredient List for Three Wen Cleansing Conditioners

<b>Ingredient</b>	<b>Sweet Almond Mint</b>	<b>Lavender</b>	<b>Pomegranate</b>
Aloe Barbadosis (Aloe Vera) leaf juice	X	X	X
Amodimethicone	X	X	X
Behentrimonium methosulfate	X	X	X
Calendula Officinalis (Marigold) Flower Extract	X	X	X
Cetearyl Alcohol	X	X	X
Cetyl Alcohol	X	X	X
Chamomilla Recutita Flower/Leaf (Chamomile) Extract	X	X	X
Citric Acid	X	X	X
Cucumis Sativus (Cucumber) Fruit Extract	-	X	-
Dicetyldimonium Chloride	-	X	-
Fragrance (Parfum)	X	-	X
Glycerin	X	X	X
Guar Hydroxypropyltrimonium Chloride	-	X	-
Hamamelis Virginiana (Witch Hazel)	-	X	-
Hydrolyzed Soy Protein	-	-	X
Hydrolyzed Wheat Protein	X	X	-
Lavandula Angustifolia (Lavender) Extract	-	X	-
Lavandula Angustifolia (Lavender) oil	-	X	-
Menthol	X	X	X
Methylchloroisothiazolinone	X	X	X
Methylisothiazolinone	X	X	X
Panthenol (Pro-Vitamin B5)	X	X	X
PEG-60 Almond Glycerides	X	X	X
Persea Gratissima (Avocado) Oil	-	X	-
Polysorbate-60	X	X	X
Prunus Amygdalus Dulcis (Sweet Almond) Oil	X	-	-
Prunus Serotina (Wild Cherry) Fruit Extract	X	-	X
Punica Granatum (Pomegranate) Extract	-	-	X
Rosmarinus Officinalis (Rosemary) Leaf Extract	X	X	X
Stearamidopropyl Dimethylamine	X	X	X
Tetrasodium EDTA	-	-	X
Triticum Vulgare (Wheat) Starch	X	X	-
Water	X	X	X

Allergenicity (Table 2):

Based on literature searches and my 20-year patch testing personal experience, the ingredients with the highest likelihood of causing allergic contact dermatitis are methylisothiazolinone and methylchlorisothiazolinone. The isothiazolinones are significant sensitizers, cause severe dermatitis (often from hair cleansing products), and are very difficult to avoid. Stearamidopropyl dimethylamine is also a common allergen but causes less severe reactions.

Fragrance as well as the specific botanical ingredients lavender and Compositae plants (Chamomile and Marigold) are the next most likely sensitizing ingredients. While fragrance allergy is overall more common than isothiazolinone allergy, most individuals can tolerate some fragrance, especially in wash-off products such as hair cleansing products. Thus, I consider these to be “moderate” sensitizers.

Ingredients which had a low likelihood of causing sensitization include some preservatives (cetearyl alcohol, cetyl alcohol, tetrasodium EDTA, polysorbate-60), botanical agents which could possibly cause problems in individuals allergic to fragrance (menthol, sweet almond oil, rosemary, wild cherry, pomegranate), and/or quaternium ammonium compounds (dicetyldimonium chloride and behentrimonium methosulfate).

Ingredients which were extremely unlikely to cause allergic contact dermatitis include several botanical agents (witch hazel, cucumber, wheat, soy, guar, aloe, avocado) as well as panthenol, PEG-60 almond glycerides, citric acid, amodimethicone, glycerin and water.

Table 2 Likelihood for Allergic Contact Dermatitis

<b>Likelihood for Allergic Contact Dermatitis</b>	<b>Sweet Almond Mint</b>	<b>Lavender</b>	<b>Pomegranate</b>
<b>HIGHEST</b>			
Methylisothiazolinone	X	X	X
Methylchlorisothiazolinone	X	X	X
Stearamidopropyl Dimethylamine	X	X	X
<b>MODERATE</b>			
Fragrance (Parfum)	X	-	X
Lavandula Angustifolia (Lavender) Extract	-	X	-
Lavandula Angustifolia (Lavender) oil	-	X	-
Chamomilla Recutita Flower/Leaf (Chamomile) Extract	X	X	X
Calendula Officinalis (Marigold) Flower Extract	X	X	X
<b>LOW</b>			
Menthol	X	X	X
Cetearyl Alcohol	X	X	X
Cetyl Alcohol	X	X	X
Tetrasodium EDTA	-	-	X
Polysorbate-60	X	X	X
Prunus Amygdalus Dulcis (Sweet Almond) Oil	X	-	-
Rosmarinus Officinalis (Rosemary) Leaf Extract	X	X	X
Prunus Serotina (Wild Cherry) Fruit Extract	X	-	X
Punica Granatum (Pomegranate) Extract	-	-	X
Dicetyldimonium Chloride	-	X	-
Behentrimonium methosulfate	X	X	X
<b>VERY UNLIKELY</b>			
Hamamelis Virginiana (Witch Hazel)	-	X	-
Cucumis Sativus (Cucumber) Fruit Extract	-	X	-
Hydrolyzed Wheat Protein	X	X	-
Triticum Vulgare (Wheat) Starch	X	X	-
Hydrolyzed Soy Protein	-	-	X
Guar Hydroxypropyltrimonium Chloride	-	X	-
Aloe Barbadensis (Aloe Vera) leaf juice	X	X	X
Panthenol (Pro-Vitamin B5)	X	X	X
PEG-60 Almond Glycerides	X	X	X
Persea Gratissima (Avocado) Oil	-	X	-
Citric Acid	X	X	X
Amodimethicone	X	X	X
Glycerin	X	X	X
Water	X	X	X



## Frequency of Ingredients in “Low-Allergen” Hair Products

### Hair Conditioners (Table 3)

Ingredients which were found in over 20% of hair conditioners in CAMP included cetearyl alcohol, cetyl alcohol, fragrance, methylisothiazolinone, methylchloroisothiazolinone, citric acid, glycerin, EDTA, panthenol, stearamidopropyl dimethylamine, amodimethicone, and behentrimonium methosulfate. None of the hair conditioners in CAMP contained witch hazel, cucumber, PEG-60 almond glycerides, avocado oil or pomegranate extract.

### Hair Shampoos (Table 4)

Ingredients which were most found in over 20% of hair shampoos in CAMP included fragrance, citric acid, stearamidopropyl dimethylamine, methylisothiazolinone, methylchloroisothiazolinone, EDTA, guar hydroxypropyltrimonium chloride, glycerin and panthenol. None of the hair shampoos in CAMP contained behentrimonium methosulfate, witch hazel or cucumber.

### Hair Styling Products (Table 5)

Ingredients which were found in over 20% of hair styling products in CAMP included fragrance, glycerin, EDTA, cetearyl alcohol, cetyl alcohol, and panthenol. At least one hair styling product in CAMP contained each ingredient. Ingredients which were found in <1% of CAMP hair styling products included: PEG-60 almond glycerides, witch hazel, dicetyldimonium chloride, avocado oil, cucumber fruit extract and pomegranate extract.



Table 3 Hair Conditioners in ACDS CAMP Which Contain Wen Cleansing Conditioner Ingredients

Ingredient	%**	Sweet Almond Mint	Lavender	Pomegranate
Cetearyl Alcohol*	(95.7)	X	X	X
Cetyl Alcohol*	(95.7)	X	X	X
Fragrance (Parfum)	(94.9)	X	-	X
Methylchloroisothiazolinone*	(47.9)	X	X	X
Methylisothiazolinone*	(47.9)	X	X	X
Citric Acid*	46.4	X	X	X
Glycerin*	45.5	X	X	X
Tetrasodium EDTA	(43.9)	-	-	X
Panthenol (Pro-Vitamin B5)*	(38.9)	X	X	X
Stearamidopropyl Dimethylamine*	(34.1)	X	X	X
Amodimethicone*	29.4	X	X	X
Behentrimonium methosulfate*	20.4 (30.3)	X	X	X
Polysorbate-60*	(19.0)	X	X	X
Calendula Officinalis (Marigold) Flower Extract*	(18.5)	X	X	X
Chamomilla Recutita Flower/Leaf (Chamomile) Extract*	(18.5)	X	X	X
Hydrolyzed Wheat Protein	16.8	X	X	-
Aloe Barbadensis (Aloe Vera) leaf juice*	14.2	X	X	X
Hydrolyzed Soy Protein	11.7	-	-	X
Rosmarinus Officinalis (Rosemary) Leaf Extract*	10.9	X	X	X
Dicetyldimonium Chloride	9.7	-	X	-
Menthol*	(8.5)	X	X	X
Prunus Amygdalus Dulcis (Sweet Almond) Oil	7.1	X	-	-
Guar Hydroxypropyltrimonium Chloride	5.1	-	X	-
Triticum Vulgare (Wheat) Starch	3.1	X	X	-
Prunus Serotina (Wild Cherry) Fruit Extract	1.5	X	-	X
Lavandula Angustifolia (Lavender) Extract	0.2	-	X	-
Lavandula Angustifolia (Lavender) oil	0.2	-	X	-
Hamamelis Virginiana (Witch Hazel)	0.0	-	X	-
Cucumis Sativus (Cucumber) Fruit Extract	0.0	-	X	-
PEG-60 Almond Glycerides*	0.0	X	X	X
Persea Gratissima (Avocado) Oil	0.0	-	X	-
Punica Granatum (Pomegranate) Extract	0.0	-	-	X
Water	n/a	X	X	X

\* Denominator = 211 (no asterisk: denominator = 196)

\*\*Parentheses = larger allergen class, including cross-reactors as described in text

Table 4 Hair Shampoos in ACDS CAMP Which Contain Wen Cleansing Conditioner Ingredients

<b>Ingredient</b>	<b>%**</b>	<b>Sweet Almond Mint</b>	<b>Lavender</b>	<b>Pomegranate</b>
Fragrance (Parfum)	(95.1)	X	-	X
Citric Acid*	78.1	X	X	X
Stearamidopropyl Dimethylamine*	(73.4)	X	X	X
Methylchloroisothiazolinone*	(55.0)	X	X	X
Methylisothiazolinone*	(55.0)	X	X	X
Tetrasodium EDTA	(52.5)	-	-	X
Guar Hydroxypropyltrimonium Chloride	41.9	-	X	-
Glycerin*	30.9	X	X	X
Panthenol (Pro-Vitamin B5)*	(30.6)	X	X	X
Polysorbate-60*	(14.0)	X	X	X
Amodimethicone*	13.3	X	X	X
Hydrolyzed Wheat Protein	11.7	X	X	-
Calendula Officinalis (Marigold) Flower Extract*	(11.5)	X	X	X
Chamomilla Recutita Flower/Leaf (Chamomile) Extract*	(11.5)	X	X	X
Aloe Barbadensis (Aloe Vera) leaf juice*	10.4	X	X	X
Cetearyl Alcohol*	(8.3)	X	X	X
Cetyl Alcohol*	(8.3)	X	X	X
Hydrolyzed Soy Protein	6.0	-	-	X
Menthol*	(5.0)	X	X	X
Rosmarinus Officinalis (Rosemary) Leaf Extract*	4.7	X	X	X
Prunus Amygdalus Dulcis (Sweet Almond) Oil	2.3	X	-	-
PEG-60 Almond Glycerides*	1.8	X	X	X
Prunus Serotina (Wild Cherry) Fruit Extract	1.5	X	-	X
Lavandula Angustifolia (Lavender) Extract	1.1	-	X	-
Lavandula Angustifolia (Lavender) oil	1.1	-	X	-
Triticum Vulgare (Wheat) Starch	1.1	X	X	-
Dicetyldimonium Chloride	0.3	-	X	-
Persea Gratissima (Avocado) Oil	0.3	-	X	-
Punica Granatum (Pomegranate) Extract	0.3	-	-	X
Behentrimonium methosulfate*	0 (6.1)	X	X	X
Hamamelis Virginiana (Witch Hazel)	0.0	-	X	-
Cucumis Sativus (Cucumber) Fruit Extract	0	-	X	-
Water	n/a	X	X	X

\*Denominator = 278 (no asterisk: denominator = 265)

\*\*Parentheses = larger allergen class, including cross-reactors as described in text

Table 5 Hair Styling Products in ACDS CAMP Which Contain Wen Cleansing Conditioner Ingredients

Ingredient	%**	Sweet Almond Mint	Lavender	Pomegranate
Fragrance (Parfum)	(96.6)	X	-	X
Glycerin*	30.6	X	X	X
Tetrasodium EDTA	(24.8)	-	-	X
Cetearyl Alcohol*	(23.4)	X	X	X
Cetyl Alcohol*	(23.4)	X	X	X
Panthenol (Pro-Vitamin B5)*	(21.6)	X	X	X
Citric Acid*	18.3	X	X	X
Polysorbate-60*	(16.8)	X	X	X
Hydrolyzed Wheat Protein	14.5	X	X	-
Stearamidopropyl Dimethylamine*	(13.2)	X	X	X
Calendula Officinalis (Marigold) Flower Extract*	(12.6)	X	X	X
Chamomilla Recutita Flower/Leaf (Chamomile) Extract*	(12.6)	X	X	X
Amodimethicone*	12.6	X	X	X
Methylchloroisothiazolinone*	(9.3)	X	X	X
Methylisothiazolinone*	(9.3)	X	X	X
Aloe Barbadensis (Aloe Vera) leaf juice*	6.9	X	X	X
Hydrolyzed Soy Protein	5.9	-	-	X
Rosmarinus Officinalis (Rosemary) Leaf Extract*	3.9	X	X	X
Guar Hydroxypropyltrimonium Chloride	3.8	-	X	-
Prunus Serotina (Wild Cherry) Fruit Extract	2.8	X	-	X
Menthol*	(2.1)	X	X	X
Triticum Vulgare (Wheat) Starch	1.9	X	X	-
Behentrimonium methosulfate*	1.8 (13.2)	X	X	X
Lavandula Angustifolia (Lavender) Extract	1.4	-	X	-
Lavandula Angustifolia (Lavender) oil	1.4	-	X	-
Prunus Amygdalus Dulcis (Sweet Almond) Oil	1.4	X	-	-
PEG-60 Almond Glycerides*	0.9	X	X	X
Hamamelis Virginiana (Witch Hazel)	0.7	-	X	-
Dicetyldimonium Chloride	0.3	-	X	-
Persea Gratissima (Avocado) Oil	0.3	-	X	-
Cucumis Sativus (Cucumber) Fruit Extract	0.3	-	X	-
Punica Granatum (Pomegranate) Extract	0.3	-	-	X
Water	n/a	X	X	X

\*Denominator = 333; no asterisk = 290

\*\*Parentheses = larger allergen class, including cross-reactors as described in text

## Details For Each Ingredient

### Aloe

*Aloe vera* (*Aloe barbadensis* Miller) was present in all 3 cleansing conditioners. *Aloe vera* is a Liliaceae plant which has been used in cosmetic products and for medicinal purposes since at least 1500 B.C. Currently it is widely used in personal care products as well as oral formulations for treatment of many ailments including cardiac diseases, infections, skin conditions and cancer. Reider and colleagues conducted a multicenter European study involving 702 patients patch tested to 3 aloe preparations: 1) an oily extract from *Aloe* leaves, 2) *Aloe pulvis* from the entire plant and 3) concentrated (10 times) *Aloe vera* gel; no patients had allergic or irritant reactions to any of these three preparations. <sup>1</sup>

Reports of *A. barbadensis* contact dermatitis are extremely rare.<sup>2</sup> This is likely due to the specific plant part utilized for extraction. *Aloe* liquid has been historically obtained from either the bark of the leaves or the layer under the bark. Three anthraquinones are present in aloe liquid: aloin, emodin and barbloin. Because aloin and emodin are very irritating, their use has been discouraged. Today, most suppliers of *Aloe* products use *Aloe* gel which is a viscous pulp found in the center of the leaves. Considering the current source of *Aloe* extracts (gel, not the historically prevalent anthraquinone-containing leaf extracts), its widespread use in topical products, and only one case report of contact dermatitis, *Aloe vera* appears to be an unlikely allergen in Wen cleansing conditioners.

*Personal experience:* I have tested approximately 100 patients with *Aloe barbadensis* extract and have had no positive reactions. I have also not heard of any anecdotal cases of reactions to *Aloe* extracts.

*ACDS CAMP:* Aloe cross-reactors in CAMP include:

- Aloe
- Aloe (*Aloe Barbadensis*) leaf juice
- Aloe Andongensis Leaf Extract
- Aloe Andongensis Leaf Juice
- Aloe Arborescens Flower Extract
- Aloe Arborescens Leaf Extract
- Aloe Arborescens Leaf Juice
- Aloe Arborescens Leaf Powder
- aloe baradensis leaf juice
- aloe barbadensis
- aloe barbadensis (aloe vera)
- Aloe Barbadensis (*Aloe Vera*) Extract

- Aloe Barbadensis (Aloe Vera) Leaf Extract
- Aloe Barbadensis (Aloe Vera) Leaf Juice
- Aloe Barbadensis (Aloe Vera) Leaf Juice Powder
- Aloe Barbadensis (Aloe)
- Aloe Barbadensis (Organic Aloe Vera) Leaf Extract
- Aloe Barbadensis Callus Culture Extract
- Aloe Barbadensis Extract
- Aloe Barbadensis Flower Extract
- Aloe Barbadensis Gel
- Aloe Barbadensis Juice Extract
- Aloe Barbadensis Leaf
- Aloe Barbadensis Leaf Extract
- Aloe Barbadensis Leaf Extract (Aloe Vera)
- Aloe Barbadensis Leaf Extract [Aloe Vera]
- Aloe Barbadensis Leaf Juice
- Aloe Barbadensis Leaf Juice (Aloe Vera)
- Aloe Barbadensis Leaf Juice Extract
- Aloe Barbadensis Leaf Juice Powder
- Aloe Barbadensis Leaf Polysaccharides
- Aloe Barbadensis Leaf Powder
- Aloe Barbadensis Leaf Water
- Aloe Barbardensis Leaf Extract
- aloe barbendensis leaf juice
- Aloe Barbensis Leaf Extract
- Aloe Ferox Leaf Extract
- Aloe Ferox Leaf Juice
- Aloe Ferox Leaf Juice Extract
- Aloe Ferox Leaf Juice Powder
- Aloe Oil Extract
- Aloe Perryi Extract
- Aloe Polysaccharide
- Aloe Polysaccharides
- Aloe Vera
- Aloe Vera (Aloe Barbadensis)
- Aloe Vera (Aloe Barbadensis) (Leaf Juice)
- Aloe Vera (Aloe Barbadensis) Extract
- Aloe Vera (Aloe Barbadensis) Extract (Aloe Leaf)
- Aloe Vera (Aloe Barbadensis) Extract (Leaf)
- Aloe Vera (Aloe Barbadensis) Gel
- Aloe Vera (Aloe Barbadensis) Leaf Extract
- Aloe Vera (Aloe Barbadensis) Leaf Juice
- Aloe Vera (Aloe Barbadensis) Leaf Juice Powder
- Aloe Vera (Aloe Barbadensis) Leaf Powder
- Aloe Vera Extract

- Aloe Vera Gel
- Aloe Vera Leaf
- Aloe Vera Leaf Extract
- Aloe Vera Leaf Juice
- Aloe Vera Oil
- Aloe Yohjyu Matsu
- Aloe Yohjyu Matsu Ekisu
- Cape Aloe
- Cape Aloe Ekisu

Of 211 hair conditioners in CAMP, 30 (14.2%) contained Aloe. Of 278 shampoos in CAMP, 29 (10.4%) contained Aloe. Of 333 hair styling products, 23 (6.9%) contained Aloe.

### **Amodimethicone**

Amodimethicone is a siloxane polymer with amino functional groups. It is primarily used as a hair conditioning agent. This group includes materials which coat or adhere to the hair. In general, siloxane polymers are very unlikely to cause contact dermatitis. A literature search found no reported cases of allergic contact dermatitis to this chemical. Amodimethicone appears to be an unlikely allergen in Wen cleansing conditioners.

*Personal experience:* I have not patch tested with amodimethicone, as it is not a recognized allergen. I have also not heard of any anecdotal cases of reactions to amodimethicone.

*ACDS CAMP:* Cross-reactors are not listed in CAMP for amodimethicone. Using the advanced search function, the following amodimethicone ingredients were found:

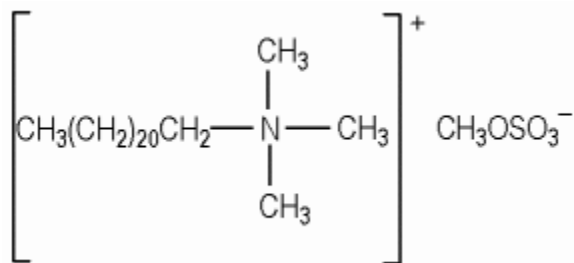
- Amodimethicone
- Amodimethicone Glycerocarbamate
- Amodimethicone Hydroxystearate
- Amodimethicone/Silsesquioxane Copolymer
- Bis Hydroxy/Methoxy Amodimethicone
- Bis PG Amodimethicone (C13-15 Alkoxy)
- Bis(C13-15 Alkoxy) Hydroxybutamidoamodimethicone
- Bis(C13-15 Alkoxy) PG-Amodimethicone
- Bis-Butyloxyamodimethicone/PEG-60 Copolymer
- Bis-Cetearyl Amodimethicone
- Bis-Hydroxy/Methoxy Amodimethicone
- Bis-Isobutyl PEG-14/Amodimethicone Copolymer
- Bis-Isobutyl PEG-15/Amodimethicone Copolymer
- Bis-Isobutyl PEG/PPG-20/35/Amodimethicone Copolymer
- Diphenyl Amodimethicone

- Disodium Amodimethicone Disuccinamide
- Methoxy Amodimethicone/silsesquioxane Copolymer
- Methoxy Amodimethicone/Silsequioxane Copolymer
- Methoxy Amodimethicone/Silsesquioxane Copolymer
- PEG-7 Amodimethicone
- PEG-8 Amodimethicone
- Perfluorononyl Dimethicone/Methicone/Amodimethicone Crosspolymer
- PG-Amodimethicone
- Trideceth-9 PG-Amodimethicone
- Trimethylsiloxane amodimethicone VP/Eicosene copolymer
- Trimethylsiloxymodimethicone
- Trimethylsilylamodimethicone

Of 211 hair conditioners in CAMP, 62 (29.4%) contained amodimethicone. Of 278 shampoos in CAMP, 37 (13.3%) contained amodimethicone. Of 333 hair styling products, 42 (12.6%) contained amodimethicone.

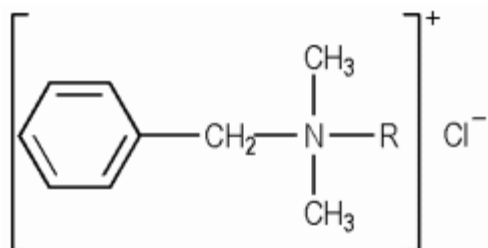
### **Behentrimonium methosulfate**

Behentrimonium methosulfate is a quaternary ammonium salt. The compound is a positively charged tetra-substituted nitrogen derivative with an anion group (methosulfate). As skin and hair proteins are slightly negatively charged, the positive charge of this compound accounts for its use as a hair conditioning agent and antistatic hair styling agent



A literature search found no reported cases of allergic contact dermatitis to this chemical. A different quaternary ammonium salt, benzalkonium chloride, has been reported as a contact allergen. Unfortunately, patch testing with benzalkonium chloride is very difficult due to its irritating properties. Benzalkonium chloride is a mixture of alkylbenzyltrimethylammonium

chlorides including alkyls (including all or some of the group beginning with capryl and extending through higher homologs with lauryl, myristyl and cetyl). The structure of benzalkonium chloride (below) is very different from behentrimonium methosulfate (above).



*Personal experience:* I have not patch tested with behentrimonium methosulfate, as it is not a recognized allergen. I have also not heard of any anecdotal cases of reactions to chemical. I patch test to benzalkonium chloride regularly and commonly see irritant reactions.

*CAMP:* Of 211 hair conditioners in CAMP, 43 (20.4%) contained behentrimonium methosulfate. Of 278 shampoos in CAMP, 0 (0%) contained behentrimonium methosulfate. Of 333 hair styling products, 6 (1.8%) contained behentrimonium methosulfate.

For the recognized allergen in the class of quaternium ammonium salts, benzalkonium chloride, CAMP lists the following cross-reactors:

- Benzalkonium Bromide
- Benzalkonium Cetyl Phosphate
- Benzalkonium Chloride
- Benzalkonium Chloride Solution
- Benzalkonium Saccharinate
- Benzethonium Chloride
- Cetalkonium Chloride
- Cetrимide BP
- Cetrимonium Bromide
- Cetrимonium Carboxydecyl PEG-8 Dimethicone
- Cetrимonium Chloride
- Cetrимonium Dimethicone PEG-7 Phthalate
- Cetrимonium Laureth-12 Succinate
- Cetrимonium Methosulfate
- Cetrимonium Saccharinate
- Cetrимonium Tosylate
- Cetylpyridinium Chloride



- Methylbenzethonium Chloride
- N-Alkyl Dimethyl Benzyl Ammonium Chloride
- N-Alkyl Dimethyl Ethylbenzyl Ammonium Chloride

Of 211 hair conditioners in CAMP, 64 (30.3%) contained benzalkonium chloride (or cross-reactors). Of 278 shampoos in CAMP, 17 (6.1%) contained benzalkonium chloride (or cross-reactors). Of 333 hair styling products, 44 (13.2%) contained benzalkonium chloride (or cross-reactors).

### **Calendula officinalis (Marigold) Flower Extract**

*Calendula officinalis* flower extract is the extract of the flower, *Calendula officinalis*, a member of the Compositae family. *Calendula* is a genus of about 15-20 species of plants in the daisy family. These plants are native to southwestern Asia, western Europe, Macaronesia, and the Mediterranean. *Calendula officinalis*, commonly known as the “pot marigold,” is frequently used in herbal and cosmetic products. It is also edible and the yellow petals can be used to color food (cheese and saffron substitute). The flowers of *C. officinalis* contain flavonol glycosides, triterpene oligoglycosides, oleanane-type triterpene glycosides, saponins, and a sesquiterpene glucoside.<sup>3 4</sup> Topical medicinal uses of *Calendula* extracts include treatment for acne, inflammation, bleeding, and pain.

From an allergy standpoint, Compositae plants are well-recognized contact allergens which are associated not only with typical contact dermatitis but also with airborne contact dermatitis, photocontact allergy, and persistent light sensitivity. The allergens are sesquiterpene lactones.<sup>5</sup> Reider and colleagues<sup>6</sup> tested 443 patients to five different Compositae allergens including marigold extracts; nine patients had positive reactions to marigold but less than half of these were positive to the Compositae mix (a commercially available allergen mix used as a screen for allergy to this family of plants), indicating that this mix is not a reliable marker for marigold sensitivity. Of the 18 patients allergic to Compositae mix, four were allergic to marigold. *Calendula* extract appears to be a weak sensitizer.

The prevalence of *Calendula* sensitivity is unknown. Data is available for the large class of Compositae plants; in the most recent NACDG data, of 4859 patients referred for patch testing, 83 (1.7%) had a positive reaction to Compositae mix; 74.7% of those reactions were currently relevant (in or likely in known products/contactants).<sup>7</sup>

*Personal experience:* I have tested approximately 3,000 patients with Compositae mix but not specifically *Calendula* extract. If a patient reacts to Compositae mix or other Compositae plants, I recommend avoidance of all plants in this family, including *Calendula*.

ACDS CAMP: Compositae cross-reactors listed in CAMP include:

- Achillea Millefolium (Yarrow) Extract
- Achillea Millefolium Extract
- Achillea Millefolium Flower Extract
- Achillea Millefolium Flower Water
- Achillea Millefolium Oil
- Alpha Bisabolol
- Ambrosia Peruviana Leaf Extract
- Anacyclus Pyrethrum Root Extract
- Anthemis Nobilis (Chamomile) Flower Extract
- Anthemis Nobilis (Chamomile) Flower Oil
- Anthemis Nobilis (Flower) Oil
- Anthemis Nobilis (Roman Chamomile) Flower Extract
- Anthemis Nobilis (Roman Chamomile) Flower Oil
- Anthemis Nobilis Extract
- Anthemis Nobilis Flower
- Anthemis Nobilis Flower Extract
- Anthemis Nobilis Flower Oil
- Anthemis Nobilis Flower Powder
- Anthemis Nobilis Flower Water
- Anthemus Nobilis Flower Extract (Chamomile)
- Arctium Lappa Root Extract
- Arctium Lappa (Burdock) Root Extract
- Arctium Lappa Fruit Extract
- Arctium Lappa Root Extract
- Arctium Lappa Root Powder
- Arctium Lappa Seed Extract
- Arctium Lappa Seed Oil
- Arctium Lappa Seed Water
- Arctium Majus Root Extract
- Arctium Majus Root Water
- Arctium Minus Root Extract
- Arnica
- Arnica Chamissonis Flower Extract
- Arnica Montana Extract
- Arnica Montana Flower
- Arnica Montana Flower Extract
- Arnica Montana Flower Water

- 
- Arnica Montana/Flower Extract
  - Artemisia Abrotanum Extract
  - Artemisia Abrotanum Extract (Flower/Leaf/Stem)
  - Artemisia Abrotanum Flower/Leaf/Stem Extract
  - Artemisia Absinthium (Wormwood) Extract
  - Artemisia Absinthium Extract
  - Artemisia Absinthium Oil
  - Artemisia Annuua Extract
  - Artemisia Annuua Leaf Extract
  - Artemisia Anomala Extract
  - Artemisia Asiatica Extract
  - Artemisia Capillaris Flower Extract
  - Artemisia Capillaris Leaf Extract
  - Artemisia Carvifolia Extract
  - Artemisia Carvifolia Powder
  - Artemisia Dracunculus
  - Artemisia Dracunculus (Tarragon) Oil
  - Artemisia Dracunculus (Tarragon) Root Extract
  - Artemisia Herba-Alba Flower Extract
  - Artemisia Herba-Alba Leaf Oil
  - Artemisia Herba-Alba Oil
  - Artemisia Maritima Extract
  - Artemisia Mongolia Leaf Extract
  - Artemisia Montana Leaf Extract
  - Artemisia Montana Leaf Powder
  - Artemisia Pallens Flower Oil
  - Artemisia Princeps Extract
  - Artemisia Princeps Leaf Extract
  - Artemisia Princeps Leaf Powder
  - Artemisia Princeps Leaf Water
  - Artemisia Tridentata
  - Artemisia Tridentata Extract
  - Artemisia Umbelliformis Extract
  - Artemisia Umbelliformis Flower Extract
  - Artemisia Umbelliforms Extract
  - Artemisia Vulgaris Extract
  - Artemisia Vulgaris Oil
  - Artemisinin

- Aster Ageratoides Extract
- Aster Glehnii Extract
- Aster Scaber Extract
- Aster Spathulifolius Extract
- Aster Tripolium Extract
- Bellis Perennis (Daisy) Extract
- Bellis Perennis (Daisy) Flower Extract
- Bisabolol
- Bisabolol (L-Alpha)
- Calendula (Calendula Officinalis) Flower Extract
- Calendula Extract
- Calendula Officinalis (Calendula) Extract
- Calendula Officinalis Extract
- Calendula Officinalis Flower
- Calendula Officinalis Flower Extract
- Calendula Officinalis Flower Oil
- Calendula Officinalis Flower Water
- Calendula Officinalis Seed Oil
- Chamomila Recuita (Matricaria) Extract
- Chamomila Recuita (Matricaria) Flower Extract
- Chamomile
- Chamomile Aqueous Extract
- Chamomile Extract
- Chamomile Flower Extract
- Chamomile Recutita (Matricaria) Flower Extract
- Chamomile Recutita Flower Extract
- Chamomilia Recutita (Matricaria) Flower Extract
- Chamomilia Recutita Flower Extract
- Chamomilla
- Chamomilla (Anthemis Nobilis) Extract
- Chamomilla Oleifera Leaf Extract
- Chamomilla Recuitita (Matricaria) Flower Extract
- Chamomilla Recutita (Matracaria) Flower Extract
- Chamomilla Recutita (Matricara) Flower Oil
- Chamomilla Recutita (Matricaria Flower Extract)
- Chamomilla Recutita (Matricaria) Extract
- Chamomilla Recutita (Matricaria) Flower
- Chamomilla Recutita (Matricaria) Flower Extract

- Chamomilla Recutita (Matricaria) Flower Leaf Extract
- Chamomilla Recutita (Matricaria) Flower Oil
- Chamomilla Recutita (Matricaria) Flower Powder
- Chamomilla Recutita (Matricaria) Flower Water
- Chamomilla Recutita (Matricaria) Flower/Leaf Extract
- Chamomilla Recutita (Matricaria) Leaf Extract
- Chamomilla Recutita (Matricaria) Oil
- Chamomilla Recutita Extract
- Chamomilla Recutita Flower
- Chamomilla Recutita Flower Extract
- Chamomilla Recutita Flower Extract (Matricaria)
- Chamomilla Recutita Flower/Leaf Extract
- Chamomilla Rucutita (Matricaria) Flower Extract
- Chamomilla Vulgaris Flower
- Chamomillia Recutita Flower Extract (Matricaria)
- Chrysanthemum Balsamita Leaf Extract
- Chrysanthemum Boreale Flower Extract
- Chrysanthemum Coccineum Flower Extract
- Chrysanthemum Dendranthema
- Chrysanthemum Indicum Flower Extract
- Chrysanthemum Morifolium Flower Extract
- Chrysanthemum Parthenium
- Chrysanthemum Parthenium (Feverfew) Extract
- Chrysanthemum Parthenium (Feverfew) Flower Extract
- Chrysanthemum Parthenium (Feverfew) Flower Powder
- Chrysanthemum Parthenium (Feverfew) Flower/Leaf/Stem Juice
- Chrysanthemum Parthenium (Feverfew) Juice
- Chrysanthemum Parthenium Extract (Feverfew)
- Chrysanthemum Parthenium Flower Extract (Feverfew)
- Chrysanthemum Sibiricum Extract
- Chrysanthemum Sinense
- Chrysanthemum Sinense Flower Extract
- Chrysanthemum Zawadskii Extract
- Cichorium Intybus (Chicory) Flower Extract
- Cichorium Intybus (Chicory) Leaf Extract
- Cichorium Intybus (Chicory) Root Extract
- Coco/Sunfloweramidopropyl Betaine
- Coneflower Extract

- Cynara Cardunculus Seed Oil
- Cynara Scolymus (Artichoke) Leaf Extract
- Dahlia Variabilis Flower Extract
- Delphinium Consolida Flower/Lonicera Caprifolium Flower/Calendula Officinalis Flower/Centaurea Cyanus Flower Extract
- Echinacea Angustifolia
- Echinacea Angustifolia (Coneflower) Extract
- Echinacea Angustifolia (Coneflower) Extract (coneflower)
- Echinacea Angustifolia Cell Culture Extract
- Echinacea Angustifolia Extract
- Echinacea Angustifolia Leaf Extract
- Echinacea Angustifolia Meristem Cell Culture
- Echinacea Angustifolia Root Extract
- Echinacea Pallida Extract
- Echinacea Purpurea Extract
- Echinacea Purpurea Flower/Leaf/Stem Extract
- Echinacea Purpurea Flower/Leaf/Stem Juice
- Echinacea Purpurea Flower/Leaf/Stem Water
- Echinacea Purpurea Leaf/Root Extract
- Echinacea Purpurea Leaf/Stem/Meristem Cell Culture Extract
- Echinacea Purpurea Root Extract
- Feverfew (Tanacetum parthenium) leaf/flower/stem juice
- Helianthus Annus (Sunflower) Oil
- Helianthus Annus (Sunflower) Seed Oil
- Helianthus Annus (Sunflower) Seed Wax
- Helianthus Annus Seed Oil
- Helianthus Annus Seed Oil (Sunflower Seed Oil)
- Helianthus Annus Seed Oil (Sunflower)
- Helianthus Annuus
- Helianthus Annuus (Sunflower) Extract
- Helianthus Annuus (Sunflower) Extract (Helianthus Annuus)
- Helianthus Annuus (Sunflower) Flower Extract
- Helianthus Annuus (Sunflower) Monoglycerides
- Helianthus Annuus (Sunflower) Oil
- Helianthus Annuus (Sunflower) Oil (Sunflower)
- Helianthus Annuus (Sunflower) Seed
- Helianthus Annuus (Sunflower) Seed Extract
- Helianthus Annuus (Sunflower) Seed Flour

- Helianthus Annuus (Sunflower) Seed Oil
- Helianthus Annuus (Sunflower) Seed Oil Glyceride
- Helianthus Annuus (Sunflower) Seed Oil Glycerides
- Helianthus Annuus (Sunflower) Seed Oil Unsaponifiables
- Helianthus Annuus (Sunflower) Seed Wax
- Helianthus Annuus (Sunflower) Seedcake
- Helianthus Annuus (Sunflower) Sprout Extract
- Helianthus Annuus Extract
- Helianthus Annuus Seed Extract
- Helianthus Annuus Seed Extract (Sunflower)
- Helianthus Annuus Seed Extract/Sunflower Seed Extract
- Helianthus Annuus Seed Oil
- Helianthus Annuus Seed Oil (Sunflower Seed Oil)
- Helianthus Annuus Seed Oil (Sunflower)
- Helianthus Annuus Seed Oil/Sunflower Seed Oil
- Helianthus Annuus Seed Wax
- Helianthus Tuberosus Extract
- Helianthus Tuberosus Root Extract
- Hydrogenated Bisabolol
- Hydrogenated Sunflower Seed Oil
- Hydrolyzed Artemisia Vulgaris Leaf
- Hydrolyzed Sunflower Seed Wax
- Inula Helenium Extract
- Lactuca Indica Extract
- Lactuca Scariola Sativa (Lettuce) Leaf Extract
- Lactuca Scariola Sativa (Lettuce) Leaf Juice
- Lactuca Virosa Leaf Extract
- Laurus Nobilis
- Laurus Nobilis Fruit Oil
- Laurus Nobilis Leaf
- Laurus Nobilis Leaf Extract
- Laurus Nobilis Leaf Oil
- Laurus Nobilis Leaf Water
- Laurus Nobilis Leaf/Stem Extract
- Laurus Nobilis Leaf/Stem Water
- Laurus Nobilis Oil
- Leonurus Artemisia Powder
- Magnolia Champaca Flower Oil

- Magnolia Champaca Flower Water
- Matricaria (Chamomilla recutita) flower extract
- Matricaria Flower Extract
- Matricaria Maritima Extract
- Matricaria Maritima Powder
- Matricaria Recutita (Chamomile) Extract
- Matricaria Recutita (Chamomile) Flower/Leaf Extract
- Methyl Sunflowerseedate
- Michelia Champaca Flower Extract
- Michelia Champaca Flower Oil
- Oil Of Laurel
- Ozonized Sunflower Seed Oil
- Parthenolide
- PEG-10 Sunflower Glycerides
- PEG-13 Sunflower Glycerides
- PEG-2 Sunflower Glycerides
- PEG-7 Sunflower Glycerides
- Phytosteryl Sunflowerseedate
- Pimenta Acris
- Pimenta Acris (Bay) Leaf Oil
- Pimenta Acris (Bay) Leaf Powder
- Pimenta Acris (Bay) Leaf Water
- Pimenta Dioica
- Pimenta Dioica Fruit Extract
- Pimenta Dioica Leaf Extract
- Pimenta Officinalis (Pimento) Fruit Extract
- Pimenta Officinalis (Pimento) Leaf Oil
- Pyrethrum Extract
- Sesquiterpene Lactone Mix
- Sesquiterpene Lactones
- Sodium Cocoyl/Palmoyl/Sunfloweroyl Glutamate
- Sodium Sunfloweramidopropyl PG-Dimonium Chloride Phosphate
- Sodium Sunflowerseedamphoacetate
- Solidago Canadensis Flower/Leaf/Stem Extract
- Solidago Odora (Goldenrod) Extract
- Solidago Virgaurea (Goldenrod) Extract
- Stellaria Media (Chickweed) Extract
- Sunflower (Helianthus Annuus)



- Sunflower Glycerides Citrate
- Sunflower Oil Decyl Esters
- Sunflower Seed Acid
- Sunflower Seed Extract
- Sunflower Seed Extract (helianthus Annuus)
- Sunflower Seed Oil
- Sunflower Seed Oil Ethyl Ferulate Esters
- Sunflower Seed Oil Glycereth-8 Esters
- Sunflower Seed Oil Glyceride
- Sunflower Seed Oil Glycerides
- Sunflower Seed Oil PEG-32 Esters
- Sunflower Seed Oil PEG-8 Esters
- Sunflower Seed Oil Polyglyceryl-10 Esters
- Sunflower Seed Oil Polyglyceryl-6 Esters
- Sunflower Seed Oil Sorbitol Esters
- Sunflower Seed Oil/Hydrogenated Sunflower Seed Oil Esters
- Sunfloweramide MEA
- Sunflowerseedamidopropyl Dimethylamine
- Sunflowerseedamidopropyl Dimethylamine Lactate
- Sunflowerseedamidopropyl Dimethylamine Malate
- Sunflowerseedamidopropyl Ethyldimonium Ethosulfate
- Sunflowerseedamidopropyl Hydroxyethyldimonium Chloride
- Sunflowerseedamidopropyl Morpholine Lactate
- Sunflowerseedamidopropyl PG-Dimonium Chloride Phosphate
- Tagetes Erecta Flower Extract
- Tagetes Erecta Flower Oil
- Tagetes Minuta Flower Oil
- Tanacetum Cinerariifolium (Pyrethrum) Flower Extract
- Tanacetum Cinerariifolium (Pyrethrum) Root Extract
- Tanacetum Parthenium (Feverfew) Leaf/Flower/Stem Juice
- Tanacetum Vulgare Extract
- Taraxacum Hallaisanensis Extract
- Taraxacum Officinale (Dandelion) Extract
- Taraxacum Officinale (Dandelion) Flower/Leaf/Stem Extract
- Taraxacum Officinale (Dandelion) Leaf Extract
- Taraxacum Officinale (Dandelion) Rhizome/Root Extract
- Taraxacum Officinale (Dandelion) Root
- Taraxacum Officinale (Dandelion) Root Extract

- Taraxacum Platycarpum Extract
- Taraxacum Sinicum Root Extract
- Wedelia Calendulacea Extract
- Wormwood Extract
- Yarrow

Of 211 hair conditioners in CAMP, 39 (18.5%) contained Compositae related ingredients. Of 278 shampoos in CAMP, 37 (11.5%) contained Compositae related ingredients. Of 333 hair styling products, 42 (12.6%) contained Compositae related ingredients.

An advanced specific search for Calendula in CAMP was not possible.

### **Cetearyl Alcohol**

Cetearyl alcohol is a mixture of fatty alcohols consisting predominantly of cetyl (C16) and stearyl (C18) alcohols. Cosmetic grades may also contain up to 5% of myristyl (C14) and lauryl (C12) alcohols. Fatty alcohols are higher molecular weight nonvolatile alcohols used as emollients in numerous types of cosmetics. They increase the viscosity of emulsions, shampoos, and other products.

Contact allergy to cetearyl alcohol has been reported. Published data is largely comprised of single case reports. One large study from the United Kingdom of 3062 consecutive patch tested patients found a 0.8% positivity rate.<sup>8</sup>

*Personal experience:* I have tested approximately 3,000 patients with cetearyl alcohol, stearyl alcohol and/or cetyl alcohol. I estimate less than 0.5% positivity rate. When positive, this allergen is almost always clinically relevant as I see these ingredients in many, many products.

*CAMP:* Cross-reactors listed in CAMP for cetearyl alcohol include:

- Acrylates/Lauryl Acrylate/Stearyl Acrylate/Ethylamine Oxide Methacrylate Copolymer
- Acrylates/Stearyl Acrylate/Dimethicone Methacrylate Copolymer
- Acrylates/Stearyl Acrylate/Ethylamine Oxide Methacrylate Copolymer
- Acrylates/Stearyl Methacrylate Copolymer
- Aluminum Isostearyl Glyceryl Phosphate
- Behendimonium Ethyl Stearyl Phosphate
- Behenyl/Isostearyl Beeswax
- Benzalkonium Cetyl Phosphate
- Bis-Behenyl/Isostearyl/Phytosteryl Dimer Dilinoleyl Dilinoleate
- Bis-Behenyl/Isostearyl/Phytosteryl Dimer Dilinoleyl Dimer Dilinoleate
- BIS-Behenyl/Isostearyl/Phytosteryl/Dimer Dilinoleyl Dimer Dilinoleate

- Bis-Cetyl Cetyl Dimethicone
- Bis-Cetyl/PEG-8 Cetyl PEG-8 Dimethicone
- Bishydroxyethyl Biscetyl Malonamide
- Bis-Isostearyl Dimer Dilinoleyl Dimer Dilinoleate
- Bis-Stearyl Dimethicone
- Bis-Stearyl Ethylenediamine/Neopentyl Glycol/Hydrogenated Dimer Dilinoleate Copolymer
- Bis-Stearyl Ethylenediamine/Neopentyl Glycol/Stearyl Hydrogenated Dimer Dilinoleate Copolymer
- Bis-Stearyl IPDI/PEG-795 Copolymer
- Butoxyhydroxypropyl Cetyl Hydroxyethylcellulose
- C18-38 Alkyl Hydroxy Stearyl Stearate
- C18-38 Alkyl Hydroxystearyl Stearate
- Cetearyl Alcohol
- Cetostearyl Alcohol
- Cetyl Acetate
- Cetyl Acetyl Ricinoleate
- Cetyl Alcohol
- Cetyl Alcohol (Coconut Oil)
- Cetyl Alcohol Euterpe Oleracea Sterols
- Cetyl Babassuate
- Cetyl Behenyl Dimethicone
- Cetyl Betainate Chloride
- Cetyl Betaine
- Cetyl C12-15 Pareth-8 Carboxylate
- Cetyl C12-15-Pareth-9 Carboxylate
- Cetyl Caprate
- Cetyl Caprylate
- Cetyl Dimethicone
- Cetyl Dimethicone Bis Vinyl Dimethicone Crosspolymer
- Cetyl Dimethicone Copolyol
- Cetyl Dimethicone PEG-7 Acetate
- Cetyl Dimethicone/Bis Vinyl Dimethicone Crosspolymer
- Cetyl Dimethicone/Bis-Vinyldimethicone Crosspolymer
- Cetyl Dimethicone/Dimethicone Crosspolymer
- Cetyl Dimethylbutyl Ether
- Cetyl Dimethyloctanoate
- Cetyl Esters

- Cetyl Ethyldimonium Ethosulfate
- Cetyl Ethylhexanoate
- Cetyl Glyceryl Ether
- Cetyl Glyceryl Ether/Glycerin Copolymer
- Cetyl Glycol
- Cetyl Glycol Isostearate
- Cetyl Hexacosyl Dimethicone
- Cetyl Hydroxyethylcellulose
- Cetyl Hydroxyethylcellulose
- cetyl hydroxyethylcellulose (plant-derived cleaning agent)
- Cetyl Isononanoate
- Cetyl Kombo Butterate
- Cetyl Lactate
- Cetyl Laurate
- Cetyl Myristate
- Cetyl Oleate
- Cetyl Palmitate
- Cetyl Pamitate
- Cetyl PCA
- Cetyl PEG
- Cetyl PEG/PPG-10 Dimethicone
- Cetyl PEG/PPG-10/1 Dimet
- Cetyl PEG/PPG-10/1 Dimethicone
- Cetyl PEG/PPG-10/1 Dimethicone HDI/Trimethylol Hexyllactone Crosspolymer
- Cetyl PEG/PPG-10/1-Dimethicone
- Cetyl PEG/PPG-15/15 Butyl Ether Dimethicone
- Cetyl PEG/PPG-7/3 Dimethicone
- Cetyl PEG-8 Dimethicone
- Cetyl PEG-PPG-10/1 Dimethicone
- Cetyl Phosphate
- Cetyl PPG-2 Isodeceth-7 Carboxylate
- Cetyl Pyrrolidonylmethyl Dimonium Chloride
- Cetyl Ricinoleate
- Cetyl Ricinoleate Benzoate
- Cetyl Stearate
- Cetyl Stearyl Alcohol
- Cetyl Tallowate
- Cetyl Tranexamate HCl

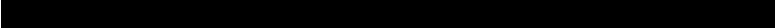
- Cetyl Triethylmonium Dimethicone PEG-8 Phthalate
- Cetyl Triethylmonium Dimethicone PEG-8 Succinate
- Cetyl/PEG/PPG 10/1 Dimethicone
- Cetyl/PEG/PPG-10/1 Dimethicone
- Cetyl/Stearyl Alcohol
- Cetyldimonium Ethyl Cetyl Phosphate
- Cetyl-PG Hydroxyethyl Decanamide
- Cetyl-PG Hydroxyethyl Palmitamide
- Cetyl-PG-Hydroxyethyl Palmitamide
- Cholesteryl Isostearyl Carbonate
- DEA-Cetyl Phosphate
- DEA-Cetyl Sulfate
- Dicocoyl Pentaerythrityl Distearyl Citrate
- Diethanolamine Cetyl Phosphate
- Dihydroxyethyl Stearyl Glycinate
- Diisostearyl Adipate
- Diisostearyl Dimer Dilinoleate
- Diisostearyl Fumarate
- Diisostearyl Glutarate
- Diisostearyl Lauroyl Glutamate
- Diisostearyl Malate
- Diisostearyl Sebacate
- Dimethiconol/Stearyl Methicone/Phenyl Trimethicone Copolymer
- Disodium Cetyl Phenyl Ether Disulfonate
- Disodium Cetyl Sulfosuccinate
- Disodium Isostearyl Ascorbyl Phosphate
- Disodium Isostearyl Sulfosuccinate
- Disodium Stearyl Sulfosuccinate
- Distearyl Citrate
- Distearyl Epoxypropylmonium Chloride
- Distearyl Ether
- Distearyl Lauroyl Glutamate
- Distearyl Phthalic Acid Amide
- Distearyl Thiodipropionate
- Distearyl dimethylamine Dilinoleate
- Distearyl dimonium Chloride
- Ethylenediamine/Stearyl Dimer Dilinoleate Copolymer
- Ethylenediamine/Stearyl Dimer Tallate Copolymer

- Ethylenediamine/Stearyl Dimerdilinoleate Copolymer
- Glycerin/Oxybutylene Copolymer Stearyl Ether
- Glycerylamidoethyl Methacrylate/Stearyl Methacrylate Copolymer
- Hydrogenated Castor Oil Cetyl Esters
- Hydrogenated Castor Oil Stearyl Esters
- Hydrogenated Olive Oil Cetyl Esters
- Hydrogenated Olive Oil Stearyl Esters
- Hydrogenated Stearyl Olive Ester
- Hydroxyethyl Isostearyloxy Isopropanolamine
- Hydroxypropyl Bisstearyldimonium Chloride
- Hydroxystearyl Cetyl Ether
- Hydroxystearyl Methylglucamine
- Isocetyl Alcohol
- Isohexadecanestearyl Alcohol
- Isostearyl Acetate
- Isostearyl Acetyl Glutamate
- Isostearyl Alcohol
- Isostearyl Avocadoate
- Isostearyl Behenamidopropyl Betainate Chloride
- Isostearyl Behenate
- Isostearyl Benzoate
- Isostearyl Benzylimidonium Chloride
- Isostearyl Diglyceryl Succinate
- Isostearyl Erucate
- Isostearyl Ethyldimonium Chloride
- Isostearyl Ethylhexanoate
- Isostearyl Ethylimidazolium Ethosulfate
- Isostearyl Ferulate
- Isostearyl Glucoside
- Isostearyl Glyceryl Ether
- Isostearyl Glyceryl Pentaerythrityl Ether
- Isostearyl Glycolate
- Isostearyl Hydroxyethyl Imidazoline
- Isostearyl Hydroxystearate
- Isostearyl Isononanoate
- Isostearyl Isostearate
- Isostearyl Isostearoyl Stearate
- Isostearyl Lactate

- Isostearyl Laurate
- Isostearyl Laurdimonium Chloride
- Isostearyl Linoleate
- Isostearyl Myristate
- Isostearyl Neopentanoate
- Isostearyl Palmitate
- Isostearyl PCA
- Isostearyl Sebacate
- Isostearyl Stearoyl Stearate
- Myristyl/Cetyl Amine Oxide
- PEG-10 Stearyl Benzonium Chloride
- PEG-150/Stearyl Alcohol/SMDI Copolymer
- PEG-150/Stearyl/SMDI Copolymer
- PEG-16 Cetyl/Oleyl/Stearyl/Lanolin Alcohol Ether
- PEG-4 Distearyl Ether
- PEG-4 Distearylethonium Ethosulfate
- PEG-5 Stearyl Ammonium Chloride
- PEG-5 Stearyl Ammonium Lactate
- PEG-5 Tristearyl Citrate
- PEG-6 Stearylguanidine
- PEG-8 Cetyl Dimethicone
- PEG-Cetyl Stearyl Diether
- Perfluorononylethyl Stearyl Dimethicone
- PG-Hydroxyethylcellulose Stearyldimonium Chloride
- Phytosteryl Isostearyl Dimer Dilinoleate
- Phytosteryl/Behenyl/Octyldodecyl/Isostearyl Lauroyl Glutamate
- Phytosteryl/Isostearyl/Cetyl/Stearyl/Behenyl Dimer Dilinoleate
- Polyethylene 20 Cetyl Ether Stearyl Alcohol
- Polyethylene glycol 20 Cetyl Ether
- Polyglyceryl-3 Cetyl Ether
- Polyoxyethylene (10) Stearyl Ether
- Polyoxyethylene (23) Cetyl Ether
- Polyoxyethylene (4) Lauryl Ether
- Polyoxyethylene Cetyl Ethers
- Polyoxyethylene Cetyl Stearyl Diether
- Polyoxyethylene-10 Cetyl Ether
- Polyoxyethylene-10-Stearyl Ether
- Polyoxyethylene-23 Cetyl Ether

- Polyoxyl 2 Stearyl Ether
- Polyoxyl 20 Cetostearyl Ether
- Polyoxyl Stearyl Ether
- Polyoxyl-2 Stearyl Ether
- Polyoxyl-20 Cetostearyl Ether
- Polyoxypropylene 15-Stearyl Ether
- Polysilicone-18 Cetyl Phosphate
- Polystearyl Methacrylate
- Polyvinyl Stearyl Ether
- Potassium Cetyl Phosphate
- PPG 10 Cetyl Ether
- PPG 15 Stearyl Ether
- PPG 15 Stearyl Ether Benzoate
- PPG-10 Cetyl Ether
- PPG-10 Cetyl Ether Phosphate
- PPG-11 Stearyl Ether
- PPG-15 Stearyl Ether
- PPG-15 Stearyl Ether Benzoate
- PPG-20 Cetyl Ether
- PPG-28 Cetyl Ether
- PPG-30 Cetyl Ether
- PPG-50 Cetyl Ether
- Propoxylated Stearyl Alcohol
- Shea Butter Cetyl Esters
- Sodium Cetostearyl Sulfate
- Sodium Cetostearyl Sulphate
- Sodium Cetyl Sulfate
- Sodium Stearyl Dimethyl Glycine
- Sodium Stearyl Fumarate
- Sodium Stearyl Lactylate
- Sodium Stearyl Phthalamate
- Sodium Stearyl Sulfate
- Sodium Zinc Cetyl Phosphate
- Steardimonium Ethyl Cetyl Phosphate
- Steardimonium Ethyl Stearyl Phosphate
- Steareth-60 Cetyl Ether
- Stearyl Acetate
- Stearyl Acetyl Glutamate



- 
- Stearyl Acetyl Glutamate
  - Stearyl Al
  - Stearyl Alcohol
  - Stearyl Aminopropyl Methicone
  - Stearyl Beeswax
  - Stearyl Behenate
  - Stearyl Benzoate
  - Stearyl Betaine
  - Stearyl Caprylate
  - Stearyl Cerotate/Carnaubate
  - Stearyl Citrate
  - Stearyl Dihydroxypropyldimonium Oligosaccharides
  - Stearyl Dimerdilinoate Copolymer
  - Stearyl Dimethicone
  - Stearyl Erucamide
  - Stearyl Erucate
  - Stearyl Ether
  - Stearyl Ethylhexanoate
  - Stearyl Ethylhexyldimonium Chloride
  - Stearyl Ethylhexyldimonium Methosulfate
  - Stearyl Gallate
  - Stearyl Glycol
  - Stearyl Glycol Isostearate
  - Stearyl Glycyrrhetinate
  - Stearyl HDI/PEG-50 Copolymer
  - Stearyl Heptanoate
  - Stearyl Hydroxyethyl Imidazoline
  - Stearyl Hydroxyethylimidonium Chloride
  - Stearyl Lactate
  - Stearyl Linoleate
  - Stearyl Methacrylate/Perfluorooctylethyl Methacrylate Copolymer
  - Stearyl Methicone
  - Stearyl Oliviate
  - Stearyl Palmitate
  - Stearyl PG-Dimethylamine
  - Stearyl PG-Dimonium Chloride Phosphate
  - Stearyl PG-Trimonium Chloride
  - Stearyl Phosphate

- Stearyl Stearate
- Stearyl Stearoyl Stearate
- Stearyl Triethoxysilane
- Stearyl Trimethicone
- Stearyl/Lauryl Methacrylate Crosspolymer
- Stearyl/Octadodecyl Citrate Crosspolymer
- Stearyl/PPG-3 Myristyl Ether Dimer Dilinoleate
- Stearyldimoniumhydroxypropyl Laurylglucosides Chloride
- Stearylgluconamide Dilaurate
- Stearylvinyl Ether/MA Copolymer
- Styrene/Stearyl Methacrylate Crosspolymer
- Tetrasodium Dicarboxyethyl Stearyl Sulfosuccinamate
- Triisostearyl Citrate
- Triisostearyl Trilinoleate
- Trisostearyl Citrate
- Tristearyl Citrate
- Tristearyl Phosphate

Of 211 hair conditioners in CAMP, 202 (95.7%) contained cetearyl alcohol-related ingredients. Of 278 shampoos in CAMP, 23 (8.3%) contained cetearyl alcohol-related ingredients. Of 333 hair styling products, 78 (23.4%) contained cetearyl alcohol-related ingredients.

### **Cetyl Alcohol**

Cetyl alcohol is a fatty alcohol used as an emollient in numerous types of cosmetics. Fatty alcohols increase the viscosity of emulsions, shampoos, and other products.

Contact allergy to cetyl alcohol is recognized. Published data is largely comprised of single case reports.<sup>9</sup> In a study of 330 patients suspected of having allergic contact dermatitis, 11.2% reacted to cetyl alcohol.<sup>10</sup>

*Personal experience:* I have tested approximately 3,000 patients with cetearyl alcohol, stearyl alcohol and/or cetyl alcohol. I estimate less than 0.5% positivity rate. When positive, this allergen is almost always clinically relevant as I see these ingredients in many, many products.

*CAMP:* Cross-reactors listed in CAMP for cetyl alcohol include:

- Acrylates/Lauryl Acrylate/Stearyl Acrylate/Ethylamine Oxide Methacrylate Copolymer
- Acrylates/Stearyl Acrylate/Dimethicone Methacrylate Copolymer
- Acrylates/Stearyl Acrylate/Ethylamine Oxide Methacrylate Copolymer

- Acrylates/Stearyl Methacrylate Copolymer
- Aluminum Isostearyl Glyceryl Phosphate
- Behendimonium Ethyl Stearyl Phosphate
- Behenyl/Isostearyl Beeswax
- Benzalkonium Cetyl Phosphate
- Bis-Behenyl/Isostearyl/Phytosteryl Dimer Dilinoleyl Dilinoleate
- Bis-Behenyl/Isostearyl/Phytosteryl Dimer Dilinoleyl Dimer Dilinoleate
- BIS-Behenyl/Isostearyl/Phytosteryl/Dimer Dilinoleyl Dimer Dilinoleate
- Bis-Cetyl Cetyl Dimethicone
- Bis-Cetyl/PEG-8 Cetyl PEG-8 Dimethicone
- Bishydroxyethyl Biscetyl Malonamide
- Bis-Isostearyl Dimer Dilinoleyl Dimer Dilinoleate
- Bis-Stearyl Dimethicone
- Bis-Stearyl Ethylenediamine/Neopentyl Glycol/Hydrogenated Dimer Dilinoleate Copolymer
- Bis-Stearyl Ethylenediamine/Neopentyl Glycol/Stearyl Hydrogenated Dimer Dilinoleate Copolymer
- Bis-Stearyl IPDI/PEG-795 Copolymer
- Butoxyhydroxypropyl Cetyl Hydroxyethylcellulose
- C18-38 Alkyl Hydroxy Stearyl Stearate
- C18-38 Alkyl Hydroxystearyl Stearate
- Cetearyl Alcohol
- Cetostearyl Alcohol
- Cetyl Acetate
- Cetyl Acetyl Ricinoleate
- Cetyl Alcohol
- Cetyl Alcohol (Coconut Oil)
- Cetyl Alcohol Euterpe Oleracea Sterols
- Cetyl Babassuate
- Cetyl Behenyl Dimethicone
- Cetyl Betainate Chloride
- Cetyl Betaine
- Cetyl C12-15 Pareth-8 Carboxylate
- Cetyl C12-15-Pareth-9 Carboxylate
- Cetyl Caprate
- Cetyl Caprylate
- Cetyl Dimethicone
- Cetyl Dimethicone Bis Vinyl Dimethicone Crosspolymer

- Cetyl Dimethicone Copolyol
- Cetyl Dimethicone PEG-7 Acetate
- Cetyl Dimethicone/Bis Vinyl Dimethicone Crosspolymer
- Cetyl Dimethicone/Bis-Vinyldimethicone Crosspolymer
- Cetyl Dimethicone/Dimethicone Crosspolymer
- Cetyl Dimethylbutyl Ether
- Cetyl Dimethyloctanoate
- Cetyl Esters
- Cetyl Ethyldimonium Ethosulfate
- Cetyl Ethylhexanoate
- Cetyl Glyceryl Ether
- Cetyl Glyceryl Ether/Glycerin Copolymer
- Cetyl Glycol
- Cetyl Glycol Isostearate
- Cetyl Hexacosyl Dimethicone
- Cetyl Hydroxyethylcellulose
- Cetyl Hydroxyethylcellulose
- cetyl hydroxyethylcellulose (plant-derived cleaning agent)
- Cetyl Isononanoate
- Cetyl Kombo Butterate
- Cetyl Lactate
- Cetyl Laurate
- Cetyl Myristate
- Cetyl Oleate
- Cetyl Palmitate
- Cetyl Pamitate
- Cetyl PCA
- Cetyl PEG
- Cetyl PEG/PPG-10 Dimethicone
- Cetyl PEG/PPG-10/1 Dimet
- Cetyl PEG/PPG-10/1 Dimethicone
- Cetyl PEG/PPG-10/1 Dimethicone HDI/Trimethylol Hexyllactone Crosspolymer
- Cetyl PEG/PPG-10/1-Dimethicone
- Cetyl PEG/PPG-15/15 Butyl Ether Dimethicone
- Cetyl PEG/PPG-7/3 Dimethicone
- Cetyl PEG-8 Dimethicone
- Cetyl PEG-PPG-10/1 Dimethicone
- Cetyl Phosphate

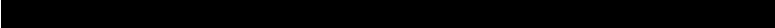
- Cetyl PPG-2 Isodeceth-7 Carboxylate
- Cetyl Pyrrolidonylmethyl Dimonium Chloride
- Cetyl Ricinoleate
- Cetyl Ricinoleate Benzoate
- Cetyl Stearate
- Cetyl Stearyl Alcohol
- Cetyl Tallowate
- Cetyl Tranexamate HCl
- Cetyl Triethylmonium Dimethicone PEG-8 Phthalate
- Cetyl Triethylmonium Dimethicone PEG-8 Succinate
- Cetyl/PEG/PPG 10/1 Dimethicone
- Cetyl/PEG/PPG-10/1 Dimethicone
- Cetyl/Stearyl Alcohol
- Cetyldimonium Ethyl Cetyl Phosphate
- Cetyl-PG Hydroxyethyl Decanamide
- Cetyl-PG Hydroxyethyl Palmitamide
- Cetyl-PG-Hydroxyethyl Palmitamide
- Cholesteryl Isostearyl Carbonate
- DEA-Cetyl Phosphate
- DEA-Cetyl Sulfate
- Dicocoyl Pentaerythrityl Distearyl Citrate
- Diethanolamine Cetyl Phosphate
- Dihydroxyethyl Stearyl Glycinate
- Diisostearyl Adipate
- Diisostearyl Dimer Dilinoleate
- Diisostearyl Fumarate
- Diisostearyl Glutarate
- Diisostearyl Lauroyl Glutamate
- Diisostearyl Malate
- Diisostearyl Sebacate
- Dimethiconol/Stearyl Methicone/Phenyl Trimethicone Copolymer
- Disodium Cetyl Phenyl Ether Disulfonate
- Disodium Cetyl Sulfosuccinate
- Disodium Isostearyl Ascorbyl Phosphate
- Disodium Isostearyl Sulfosuccinate
- Disodium Stearyl Sulfosuccinate
- Distearyl Citrate
- Distearyl Epoxypropylmonium Chloride

- Distearyl Ether
- Distearyl Lauroyl Glutamate
- Distearyl Phthalic Acid Amide
- Distearyl Thiodipropionate
- Distearyl dimethylamine Dilinoleate
- Distearyl dimonium Chloride
- Ethylenediamine/Stearyl Dimer Dilinoleate Copolymer
- Ethylenediamine/Stearyl Dimer Tallate Copolymer
- Ethylenediamine/Stearyl Dimerdilinoleate Copolymer
- Glycerin/Oxybutylene Copolymer Stearyl Ether
- Glycerylamidoethyl Methacrylate/Stearyl Methacrylate Copolymer
- Hydrogenated Castor Oil Cetyl Esters
- Hydrogenated Castor Oil Stearyl Esters
- Hydrogenated Olive Oil Cetyl Esters
- Hydrogenated Olive Oil Stearyl Esters
- Hydrogenated Stearyl Olive Ester
- Hydroxyethyl Isostearyloxy Isopropanolamine
- Hydroxypropyl Bisstearyldimonium Chloride
- Hydroxystearyl Cetyl Ether
- Hydroxystearyl Methylglucamine
- Isocetyl Alcohol
- Isohexadecanestearyl Alcohol
- Isostearyl Acetate
- Isostearyl Acetyl Glutamate
- Isostearyl Alcohol
- Isostearyl Avocadoate
- Isostearyl Behenamidopropyl Betainate Chloride
- Isostearyl Behenate
- Isostearyl Benzoate
- Isostearyl Benzylimidonium Chloride
- Isostearyl Diglyceryl Succinate
- Isostearyl Erucate
- Isostearyl Ethyldimonium Chloride
- Isostearyl Ethylhexanoate
- Isostearyl Ethylimidazolium Ethosulfate
- Isostearyl Ferulate
- Isostearyl Glucoside
- Isostearyl Glyceryl Ether

- Isostearyl Glyceryl Pentaerythrityl Ether
- Isostearyl Glycolate
- Isostearyl Hydroxyethyl Imidazoline
- Isostearyl Hydroxystearate
- Isostearyl Isononanoate
- Isostearyl Isostearate
- Isostearyl Isostearoyl Stearate
- Isostearyl Lactate
- Isostearyl Laurate
- Isostearyl Laurdimonium Chloride
- Isostearyl Linoleate
- Isostearyl Myristate
- Isostearyl Neopentanoate
- Isostearyl Palmitate
- Isostearyl PCA
- Isostearyl Sebacate
- Isostearyl Stearoyl Stearate
- Myristyl/Cetyl Amine Oxide
- PEG-10 Stearyl Benzonium Chloride
- PEG-150/Stearyl Alcohol/SMDI Copolymer
- PEG-150/Stearyl/SMDI Copolymer
- PEG-16 Cetyl/Oleyl/Stearyl/Lanolin Alcohol Ether
- PEG-4 Distearyl Ether
- PEG-4 Distearylethonium Ethosulfate
- PEG-5 Stearyl Ammonium Chloride
- PEG-5 Stearyl Ammonium Lactate
- PEG-5 Tristearyl Citrate
- PEG-6 Stearylguanidine
- PEG-8 Cetyl Dimethicone
- PEG-Cetyl Stearyl Diether
- Perfluorononylethyl Stearyl Dimethicone
- PG-Hydroxyethylcellulose Stearyldimonium Chloride
- Phytosteryl Isostearyl Dimer Dilinoleate
- Phytosteryl/Behenyl/Octyldodecyl/Isostearyl Lauroyl Glutamate
- Phytosteryl/Isostearyl/Cetyl/Stearyl/Behenyl Dimer Dilinoleate
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- Polyethylene glycol 20 Cetyl Ether
- Polyglyceryl-3 Cetyl Ether

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- Polyoxyethylene (23) Cetyl Ether
- Polyoxyethylene (4) Lauryl Ether
- Polyoxyethylene Cetyl Ethers
- Polyoxyethylene Cetyl Stearyl Diether
- Polyoxyethylene-10 Cetyl Ether
- Polyoxyethylene-10-Stearyl Ether
- Polyoxyethylene-23 Cetyl Ether
- Polyoxyl 2 Stearyl Ether
- Polyoxyl 20 Cetostearyl Ether
- Polyoxyl Stearyl Ether
- Polyoxyl-2 Stearyl Ether
- Polyoxyl-20 Cetostearyl Ether
- Polyoxypropylene 15-Stearyl Ether
- Polysilicone-18 Cetyl Phosphate
- Polystearyl Methacrylate
- Polyvinyl Stearyl Ether
- Potassium Cetyl Phosphate
- PPG 10 Cetyl Ether
- PPG 15 Stearyl Ether
- PPG 15 Stearyl Ether Benzoate
- PPG-10 Cetyl Ether
- PPG-10 Cetyl Ether Phosphate
- PPG-11 Stearyl Ether
- PPG-15 Stearyl Ether
- PPG-15 Stearyl Ether Benzoate
- PPG-20 Cetyl Ether
- PPG-28 Cetyl Ether
- PPG-30 Cetyl Ether
- PPG-50 Cetyl Ether
- Propoxylated Stearyl Alcohol
- Shea Butter Cetyl Esters
- Sodium Cetostearyl Sulfate
- Sodium Cetostearyl Sulphate
- Sodium Cetyl Sulfate
- Sodium Stearyl Dimethyl Glycine
- Sodium Stearyl Fumarate
- Sodium Stearyl Lactylate



- 
- Sodium Stearyl Phthalamate
  - Sodium Stearyl Sulfate
  - Sodium Zinc Cetyl Phosphate
  - Steardimonium Ethyl Cetyl Phosphate
  - Steardimonium Ethyl Stearyl Phosphate
  - Steareth-60 Cetyl Ether
  - Stearyl Acetate
  - Stearyl Acetyl Glutamate
  - Stearyl Acetyl Glutamate
  - Stearyl Al
  - Stearyl Alcohol
  - Stearyl Aminopropyl Methicone
  - Stearyl Beeswax
  - Stearyl Behenate
  - Stearyl Benzoate
  - Stearyl Betaine
  - Stearyl Caprylate
  - Stearyl Cerotate/Carnaubate
  - Stearyl Citrate
  - Stearyl Dihydroxypropyldimonium Oligosaccharides
  - Stearyl Dimerdilinoate Copolymer
  - Stearyl Dimethicone
  - Stearyl Erucamide
  - Stearyl Erucate
  - Stearyl Ether
  - Stearyl Ethylhexanoate
  - Stearyl Ethylhexyldimonium Chloride
  - Stearyl Ethylhexyldimonium Methosulfate
  - Stearyl Gallate
  - Stearyl Glycol
  - Stearyl Glycol Isostearate
  - Stearyl Glycyrrhetinate
  - Stearyl HDI/PEG-50 Copolymer
  - Stearyl Heptanoate
  - Stearyl Hydroxyethyl Imidazoline
  - Stearyl Hydroxyethylimidonium Chloride
  - Stearyl Lactate
  - Stearyl Linoleate

- Stearyl Methacrylate/Perfluorooctylethyl Methacrylate Copolymer
- Stearyl Methicone
- Stearyl Oliviate
- Stearyl Palmitate
- Stearyl PG-Dimethylamine
- Stearyl PG-Dimonium Chloride Phosphate
- Stearyl PG-Trimonium Chloride
- Stearyl Phosphate
- Stearyl Stearate
- Stearyl Stearoyl Stearate
- Stearyl Triethoxysilane
- Stearyl Trimethicone
- Stearyl/Lauryl Methacrylate Crosspolymer
- Stearyl/Octadodecyl Citrate Crosspolymer
- Stearyl/PPG-3 Myristyl Ether Dimer Dilinoleate
- Stearyldimoniumhydroxypropyl Laurylglucosides Chloride
- Stearylgluconamide Dilaurate
- Stearylvinyl Ether/MA Copolymer
- Styrene/Stearyl Methacrylate Crosspolymer
- Tetrasodium Dicarboxyethyl Stearyl Sulfosuccinamate
- Triisostearyl Citrate
- Triisostearyl Trilinoleate
- Trisostearyl Citrate
- Tristearyl Citrate
- Tristearyl Phosphate

Of 211 hair conditioners in CAMP, 202 (95.7%) contained cetyl alcohol-related ingredients. Of 278 shampoos in CAMP, 23 (8.3%) contained cetyl alcohol-related ingredients. Of 333 hair styling products, 78 (23.4%) contained cetyl alcohol-related ingredients.

### **Chamomilla Recutita Flower/Leaf (Chamomile) Extract**

Chamomile extracts (including *Anthemis nobilis*, *Chamomilla recutita*, “chamomile”, “German chamomile”, and bisabolol) have been used in herbal medicine for wound healing as well as ingested for various ailments. A recent randomized, partially double-blind study suggested that topical chamomile was similarly efficacious to low potency topical steroids (0.5% hydrocortisone cream) for treatment of atopic dermatitis.<sup>11</sup>

As a member of the Compositae family, it is represented in the “Compositae mix”, a patch allergen preparation available from many allergen suppliers. It is also one of the 36 allergens tested on TRUE Test. The latest data from the NACDG found a positive patch test reaction rate of 1.7%.<sup>7</sup> Sensitization to other related chemicals such as parthenolide (0.8%) and sesquiterpene lactone mix (0.9%) is also low.<sup>7</sup>

Primary sensitization from chamomile is less common relative to other Compositae species,<sup>12</sup> but individuals sensitized from other, related Compositae compounds could develop allergic contact dermatitis from a product containing chamomile extract.

*Personal experience:* I have tested approximately 1000 patients with Chamomile extract and have had less than 10 positive reactions. Many have reacted to other Compositae plants and/or Compositae mix or sesquiterpene lactone mix. Some have had an airborne pattern of dermatitis (exposed areas: face, anterior neck, hands) from airborne plant materials (sesquiterpene lactones carried on trichomes, hair-like plant parts).

*CAMP:* Please see search under Calendula

### **Citric Acid**

Citric Acid is an organic acid used in personal care products as a chelating agent, fragrance or pH adjuster. Chelating agents sequester metallic ions such calcium, magnesium, iron and copper to prevent oxidation and enhance stability. pH Adjusters are chemicals (acids, bases, or buffering agents) which are used to control the pH of finished cosmetic products.

There were no reports of contact dermatitis to citric acid. It is not available as a commercial allergen for testing.

*Personal Experience:* I have not patch tested to citric acid. When I have a patient with fragrance allergy, I do not recommend avoidance of citric acid. I commonly see citric acid on labels of personal care products. Given the widespread use of this ingredient and lack of reports of sensitivity, citric acid is unlikely to cause allergic reactions.

*CAMP:* Because citric acid is not recognized as a common allergen, no cross-reactors are defined in CAMP. Using an advanced search mode, the following results were obtained:

Of 211 hair conditioners in CAMP, 98 (46.4%) contained citric acid. Of 278 shampoos in CAMP, 217 (78.1%) contained citric acid. Of 333 hair styling products, 61 (18.3%) contained citric acid.

## **Cucumis Sativus (Cucumber) Fruit Extract**

While type I (immediate type hypersensitivity) to cucumber is known, a literature search found no reports of allergic contact dermatitis (delayed type hypersensitivity) due to cucumber extract. Contact urticaria to cucumbers has been reported.<sup>13</sup>

*Personal experience:* I have not patch tested with cucumber extract and do not know of any anecdotal cases of contact allergy.

*CAMP:* Cucumber extract is not listed in CAMP as a specific allergen. Using the advanced search function (which does not capture all synonyms and cross-reactors), the following was found:

- Cucumber (Cucumis Sativus) Extract
- Cucumber (Cucumis Sativus) Fruit Extract
- Cucumber Extract
- Cucumis Sativa (Cucumber) Fruit Extract
- Cucumis Sativus (Cucumber) Extract
- Cucumis Sativus (Cucumber) Fruit
- Cucumis Sativus (Cucumber) Fruit Extract
- Cucumis Sativus (Cucumber) Fruit Water
- Cucumis Sativus (Cucumber) Juice
- Cucumis Sativus (Cucumber) Oil
- Cucumis Sativus (Cucumber) Seed
- Cucumis Sativus (Cucumber) Seed Extract
- Cucumis Sativus (Cucumber) Seed Oil
- Cucumis Sativus Fruit (Cucumber) Water
- Cucumis Sativus Fruit Extract (Cucumber)
- Hydrolyzed Cucumber Fruit
- Luffa Cylindrica Fruit/Daucus Carota Sativa (Carrot) Root/Cucumis Sativus (Cucumber) Fruit Extract
- Sea Cucumber Extract

*CAMP:* Of 196 hair conditioners in CAMP, 0 (0%) contained cucumber extract. Of 265 shampoos in CAMP, 0 (0%) contained cucumber extract. Of 290 hair styling products, 1 (0.3%) contained cucumber extract.

## **Dicetyldimonium Chloride**

Dicetyldimonium chloride is a quaternary ammonium compound (like behentrimonium methosulfate). Contact dermatitis to quaternary ammonium compounds is listed above under behentrimonium methosulfate. A literature search found no published reports of allergy to dicetyldimonium chloride.

*Personal experience:* I have no experience patch testing with this compound.

*CAMP:* The numbers of products containing quaternary ammonium compounds is listed above under behentrimonium methosulfate. CAMP does not list dicetyldimonium chloride as a specific allergen. Using the advanced search function (which does not capture all synonyms and cross-reactors), the following was found:

Of 196 hair conditioners in CAMP, 19 (9.7%) contained dicetyldimonium chloride. Of 265 shampoos in CAMP, 1 (0.3%) contained dicetyldimonium chloride. Of 290 hair styling products, 1 (0.3%) contained dicetyldimonium chloride.

## **Fragrance (Parfum)**

In almost all large North American studies, positive reaction rates to fragrance mix I are in the top five most commonly identified allergens.<sup>7 14 15 16 17 18 19</sup> Fragrances are natural or synthetic substances used to impart an aroma to a product. Most perfumes comprise many fragrances. Fragrance markers (Fragrance mix I, Fragrance mix II, and *Myroxylon pereirae*) are patch test preparations used to detect fragrance allergy. Fragrance mix I contains oak moss absolute, cinnamic aldehyde, cinnamic alcohol, alpha-amyl cinnamic alcohol (amylcinnamaldehyde), geraniol, hydroxycitronellal, isoeugenol, and eugenol. Fragrance mix II contains lylal (hydroxyisohexyl cyclohexene carboxaldehyde), citral, farnesol, citronellol, hexyl cinnamic aldehyde and coumarin. *Myroxylon pereirae* (also known as balsam of Peru) is a sweet-smelling natural substance derived from a Central American tree. It is a complex substance which contains many potential allergens including benzoic acid, benzyl acetate, benzyl benzoate, benzyl cinnamate, cinnamic acid, cinnamic alcohol, cinnamic aldehyde, cinnamyl cinnamate, eugenol, farnesol, isoeugenol, nerolidol, and vanillin.

Delayed-type hypersensitivity to fragrance is very common. In the last NACDG reporting cycle,<sup>7</sup> fragrance mix I was the second most common allergen reported (11.9% positive reactions). *Myroxylon pereirae* and fragrance mix II caused positive reactions in 7.2% (7<sup>th</sup> most frequent) and 5.7% (11<sup>th</sup> most frequent) of tested patients, respectively. This underrepresents the frequency of fragrance sensitivity, however, as these three fragrance markers do not detect all fragrance allergy. Individuals with reactions to fragrance materials, however, may be able to tolerate some fragranced products, as the individual components of each fragrance varies.

Because individual components of fragrance are not required on U.S. labeling, avoidance typically involves avoidance of all fragrance and fragrance-related ingredients.

*Personal Experience:* I have patch tested approximately 5,000 individuals with fragrance materials. It is one of the most common allergies I see.

*CAMP:* CAMP lists 1444 ingredient names (data not shown) as potential cross-reactors. Of 196 hair conditioners in CAMP, 186 (94.9%) contain fragrance-related ingredients. Of 265 shampoos in CAMP, 252 (95.1%) contain fragrance-related ingredients. Of 290 hair styling products, 280 (96.6%) contain fragrance-related ingredients.

### **Glycerin**

Glycerin is a polyhydric alcohol which contains three or more hydroxyl groups per molecule. It functions as a humectant and cosolvent.

Glycerin is a rare contact allergen. There have been two case reports of allergy to glycerin.<sup>20 21</sup> Because it is such a rare allergen and much less irritating than propylene glycol, another humectant, it is commonly used in “sensitive skin products.”

*Personal Experience:* I have patch tested approximately 10 patients to glycerin with no positive reactions. Given the widespread use and lack of reports of sensitivity, glycerin is unlikely to cause allergic reactions.

*CAMP:* Because glycerin is not recognized as a common allergen, no cross-reactors are defined in CAMP. Using an advanced search mode, the following results were obtained:

Of 211 hair conditioners in CAMP, 96 (45.5%) contained glycerin. Of 278 shampoos in CAMP, 86 (30.9%) contained glycerin. Of 333 hair styling products, 61 (30.6%) contained glycerin.

### **Guar Hydroxypropyltrimonium Chloride**

Guar Hydroxypropyltrimonium Chloride is a quaternary ammonium derivative of Hydroxypropyl Guar. Hydroxypropyl Guar is a propylene glycol ether of *Cyamopsis tetragonoloba* (Guar) Gum. Gums are plant-derived carbohydrates which swell in the presence of water. In personal care products, gums are used to impart viscosity.

One report of type I (immediate type hypersensitivity) contact urticaria to a guar derivative has been reported.<sup>22</sup> A literature search found no reports of allergic contact dermatitis (delayed type hypersensitivity) due to guar or hydroxypropyltrimonium.

*Personal experience:* I have no experience patch testing with guar hydroxypropyltrimonium chloride.

*CAMP:* Guar hydroxypropyltrimonium is not listed in CAMP as a specific allergen. Using the advanced search function (which does not capture all synonyms and cross-reactors), the following was found:

- Guar Hydroxypropyltrimonium Chloride
- Hydroxypropyl Guar Hydroxypropyltrimonium Chloride

Of 196 hair conditioners in CAMP, 10 (5.1%) contained guar hydroxypropyltrimonium chloride. Of 265 shampoos in CAMP, 111 (41.9%) contained guar hydroxypropyltrimonium chloride. Of 290 hair styling products, 11 (3.8%) contained guar hydroxypropyltrimonium chloride.

### **Hamamelis virginiana (Witch Hazel)**

Witch hazel is derived from the tree, *Hamamelis virginiana*. Contact dermatitis has been reported from an eye gel containing this ingredient.<sup>23</sup> Bruynzeel and colleagues reported 4/1032 patients tested with a positive patch test reactions to an ointment containing 25% witch hazel<sup>24</sup>.

*Personal experience:* I have patch tested approximately 10 individuals to witch hazel extract with no positive reactions.

*CAMP:* Witch hazel extract is not listed in CAMP as a specific allergen. Using the advanced search function (which does not capture all synonyms and cross-reactors), the following was found:

- aqua hamamelis (witch hazel)
- Hamamelis Virginia (Witch Hazel) Extract
- Hamamelis Virginia (Witch Hazel) Bark/Leaf/Twig Extract
- Hamamelis Virginia (Witch Hazel) Extract
- Hamamelis Virginia (Witch Hazel) Flower Water
- Hamamelis Virginia (Witch Hazel) Leaf Extract
- Hamamelis Virginia (Witch Hazel) Leaf Water
- Hamamelis Virginia (Witch Hazel) Water
- Witch Hazel
- Witch Hazel (Hamamelis Virginia) Distillate

- Witch Hazel (Hamamelis Virginiana) Extract
- Witch Hazel Distillate
- Witch Hazel Extract
- Witch Hazel Water

Of 196 hair conditioners in CAMP, 0 (0%) contained witch hazel ingredients. Of 265 shampoos in CAMP, 0 (0%) contained witch hazel ingredients. Of 290 hair styling products, 2 (0.7%) contain witch hazel ingredients.

### **Hydrolyzed Soy Protein**

While type I (immediate type hypersensitivity) to soy is well-recognized, a literature search found no reports of allergic contact dermatitis (delayed type hypersensitivity) due to soy.

*Personal experience:* I have no experience patch testing with soy protein.

*CAMP:* Soy is not listed in CAMP as a specific allergen. Using the advanced search function (which does not capture all synonyms and cross-reactors), the following was found:

- AMP-Isostearoyl Hydrolyzed Soy Protein
- AMP-Isostearoyl Wheat/Corn/Soy Amino Acids
- Bis-Hydroxyethoxypropyl Dimethicone/PEG-2 Soyamine/IPDI Copolymer
- Bis-Soyoyl/Rapeseedoyl Ethyl Hydroxyethylmonium Methosulfate
- Cocodimonium Hydroxypropyl Hydrolyzed Soy Protein
- Cocoyl Hydrolyzed Soy Protein
- Cryptocarya Massoy
- Cryptocarya Massoy Bark Extract
- Di-PEG-2 Soyamine IPDI
- Dihydroxyethyl Soy Glycinate
- Dihydroxyethyl Soyamine Dioleate
- Dimethyl Soyamine
- Disodium Soyamphodiacetate
- Disoyamidoethyl Hydroxyethyl Ammonium Lactate
- Disoyamine
- Disoydimonium Chloride
- Disoyoylethyl Hydroxyethylmonium Methosulfate
- Epoxidized Soybean Oil
- Feruloyl Soy Glycerides
- Glycene Soja (Soybean) Seed Extract




- Glyceryl Hydrogenated Soyate
- Glycine Max (Soybean) Fiber
- Glycine Max (Soybean) Polypeptide
- Glycine Max (Soybean) Seed Extract
- Glycine Max (Soybean) Seed Powder
- Glycine Max (Soybean) Seedcoat Extract
- Glycine Max (Soybean) Sprout Extract
- Glycine Max (Soybean) Symbiosome Extract
- Glycine Soja (Soybean Oil)
- Glycine Soja (Soybean) Extract
- Glycine Soja (Soybean) Fiber
- Glycine Soja (Soybean) Flour
- Glycine Soja (Soybean) Germ Extract
- Glycine Soja (Soybean) Hull
- Glycine Soja (Soybean) Lipids
- Glycine Soja (Soybean) Oil
- Glycine Soja (Soybean) Oil Unsaponifiables
- Glycine Soja (Soybean) Peptide
- Glycine Soja (Soybean) Phytoplacenta Extract
- Glycine Soja (Soybean) Protein
- Glycine Soja (Soybean) Seed
- Glycine Soja (Soybean) Seed Extract
- Glycine soja (soybean) seed oil
- Glycine Soja (Soybean) Seed Powder
- Glycine Soja (Soybean) Seed Protein Extract
- Glycine Soja (Soybean) Seed Water
- Glycine Soja (Soybean) Seedcake Extract
- Glycine Soja (Soybean) Sprout Extract
- Glycine Soja (Soybean) Sterol
- Glycine Soja (Soybean) Sterols
- Glycine Soja Oil (Soybean)
- Glycine Soja Oil/Soybean Oil
- Glycine Soja Protein (Soybean Protein)
- Glycine soja protein (Soybean)
- Glycine Soja Seed Extract (soybean)
- Glycine Soja Sterol (Soybean)
- Glycine Soja Sterols (Soybean)
- Glycine Soya (Soybean) Oil

- Glycine Soya (Soybean) Sterols
- Glycol Dipalmitate/Rapeseedate/Soyate
- Hydrogenated Soy Glyceride
- Hydrogenated Soy Glycerides
- Hydrogenated Soy Polyglyceride
- Hydrogenated Soy Polyglycerides
- Hydrogenated Soy Polyglycerides
- Hydrogenated Soybean Oil
- Hydrolyzed Corn/Soy/Wheat Protein Thioglycolamide/Thiopropionamide
- Hydrolyzed Soy
- Hydrolyzed Soy Extract
- Hydrolyzed Soy Flour
- Hydrolyzed Soy Protein
- Hydrolyzed Soy Protein Extract
- Hydrolyzed Soy Protein PG-Propyl Methylsilanediol
- Hydrolyzed Soy Protein/Vegetable Amino Acids/Lysine Hydroxypropyltrimonium Chloride
- Hydrolyzed Soy Starch
- Hydrolyzed Soybean Extract
- Hydrolyzed Soymilk Protein
- Hydroxylated Methyl Soyate Trimethylolpropane Ether
- Hydroxylated Soy Lecithin
- Hydroxypropyltrimonium Corn/Wheat/Soy Amino Acids
- Hydroxypropyltrimonium Hydrolyzed Soy Protein
- IPDI/PEG-15 Soy Glycinate Copolymer
- IPDI/PEG-15 Soyamine Copolymer
- IPDI/PEG-15 Soyamine Oxide Copolymer
- IPDI/PEG-15 Soyethonium Ethosulfate Copolymer
- Lactobacillus/Soybean Seed Ferment Extract
- Laurdimonium Hydroxypropyl Hydrolyzed Soy Protein
- Maleated Soybean Oil
- Massey Bark Oil
- Methyl Soyate
- Partially Hydrogenated Soybean Oil
- PEG 10 Soy Sterol
- PEG 5 Soy Sterol
- PEG-10 Soy Sterol
- PEG-10 Soyamine

- PEG-15 Soyamine
- PEG-16 Soy Sterol
- PEG-2 Soyamine
- PEG-20 Soy Sterol
- PEG-25 Soy Sterol
- PEG-25 Soya Sterol
- PEG-3 Disoyoylamidoethylmonium Methosulfate
- PEG-30 Glyceryl Soyate
- PEG-30 Soy Sterol
- PEG-35 Soy Glycerides
- PEG-40 Soy Sterol
- PEG-5 Soy Sterol
- PEG-5 Soyamine
- PEG-7 Glyceryl Soyate
- PEG-75 Soy Glycerides
- PEG-8 Soyamine
- PEG-9 Soyate
- PG-Hydrolyzed Soy Protein
- Polyglyceryl-3 Soyate/Shea Butterate
- Potassium Abietoyl Hydrolyzed Soy Protein
- Potassium Cocoyl Hydrolyzed Soy Protein
- Potassium Lauroyl Hydrolyzed Soy Protein
- Potassium Soyate
- Potassium Undecylenoyl Hydrolyzed Soy Protein
- PPG-3 Hydroxyethyl Soyamide
- Propylene Glycol Soyate
- Propyltrimonium Hydrolyzed Soy Protein
- Pterocarpus Soyauxii Wood Extract
- Quaternium-79 Hydrolyzed Soy Protein
- Rahnella/Soy Protein Ferment
- Sodium C8-16 Isoalkylsuccinyl Soy Sulfonate
- Sodium Cocoyl Hydrolyzed Soy Protein
- Sodium Soyate
- Sodium Stearoyl Hydrolyzed Soy Protein
- Sodium Stearoyl Soy Protein
- Sodium/TEA-Undecylenoyl Hydrolyzed Soy Protein
- Soy Acid
- Soy Amino Acid

- Soy Amino Acids
- Soy Dihydroxypropyldimonium Glucoside
- Soy Hydroxyethyl Imidazoline
- Soy Isoflavones
- Soy Lecithin
- Soy Oil
- Soy Protein Phthalate
- soy sterol
- Soy Sterol Acetate
- Soy Triethoxysilylpropyldimonium Chloride
- Soya Liposomes
- Soya Sterol
- Soyalkonium Chloride
- Soyamide DEA
- Soyamidoethyltrimonium Hydroxypropyl Hydrolyzed Wheat Protein
- Soyamidopropalkonium Chloride
- Soyamidopropyl Betaine
- Soyamidopropyl Dimethylamine
- Soyamidopropyl Ethyldimonium Ethosulfate
- Soyamidopropylamine Oxide
- Soyamine
- Soyaminopropylamine
- Soybean (Glycine soja) protein
- Soybean (Glycine soja) seed extract
- Soybean (Glycine Soja) Sterols
- Soybean Glycerides
- Soybean Glycine Soya Sterols
- Soybean Lipid
- Soybean Oil
- Soybean Oil Glycereth-8 Esters
- Soybean Oil PEG-20 Esters
- Soybean Oil PEG-36 Esters
- Soybean Oil PEG-8 Esters
- Soybean Oil Polyglyceryl-6 Esters
- Soybean Oil Propylene Glycol Esters
- Soybean Oil/Ferulate Esters
- Soybean Palmitate
- Soybean Peroxidase

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- Soybean Seed Extract
  - Soybean Sterols
  - Soydimonium Hydroxypropyl Hydrolyzed Wheat Protein
  - Soyethyl Morpholinium Ethosulfate
  - Soyethylidimonium Ethosulfate
  - Soymilk
  - Soymilk Powder
  - Soy you Ekisu
  - Soytrimonium Chloride
  - Steardimonium Hydroxypropyl Hydrolyzed Soy Protein
  - Sucrose Polysoyate
  - Sulfhydryl Modified Hydrolyzed Soy Protein
  - TEA-Cocoyl Hydrolyzed Soy Protein

Of 196 hair conditioners in CAMP, 23 (11.7%) contained soy-related ingredients. Of 265 shampoos in CAMP, 616 (6.0%) contain soy-related ingredients. Of 290 hair styling products, 17 (5.9%) contain soy-related ingredients.

### **Hydrolyzed Wheat Protein**

Hydrolyzed Wheat Protein is the hydrolysate of wheat protein derived by acid, enzyme or other method of hydrolysis. It is used as a conditioning agent in hair products.

Wheat is a well-recognized cause of immediate type (IgE-mediated) reactions resulting in contact urticaria or protein contact dermatitis (an IgE-mediated form of dermatitis). Many cases are occupationally-related (in bakers) but reactions from personal care products have also been reported. Hydrolyzed wheat protein in a soap caused a mini-epidemic of contact urticaria in Japan; 2000 users of a facial soap containing Glupearl 19S a hydrolysed wheat protein, developed immediate-type systemic wheat allergy, and approximately two-thirds of them developed associated contact urticaria.<sup>25</sup>

Delayed-type allergic contact dermatitis is rare but has been reported. Two cases involved positive patch test to a cosmetic cream containing hydrolyzed wheat protein.<sup>26 27</sup> A third case involved a 3 year-old girl with eczema who was patch test positive to an emollient containing palmitoyl hydrolyzed wheat protein as well as to the palmitoyl hydrolyzed wheat protein itself.<sup>28</sup>

*Personal Experience:* I have no experience patch testing with hydrolyzed wheat protein.

*CAMP*: Hydrolyzed wheat protein is not a recognized allergen category in *CAMP*. Using an advanced search function, the following were found listed:

- AMP Isostearoyl Hydrolyzed Wheat Protein
- AMP-Isostearoyl Hydrolyzed Wheat Protein
- Cocodimonium Hydroxypropyl Hydrolyzed Wheat Protein
- Cocoyl Hydrolyzed Wheat Protein
- Ethyltrimonium Chloride Methacrylate/Hydrolyzed Wheat Protein Copolymer
- Hydrolyzed Wheat Protein
- Hydrolyzed Wheat Protein (Wheat)
- Hydrolyzed Wheat Protein Hydroxypropyl Polysiloxane
- Hydrolyzed Wheat Protein PG Propyl Silanetriol
- Hydrolyzed Wheat Protein PG-Propyl Methylsilanediol
- Hydrolyzed Wheat Protein PG-Propyl Silanetriol
- Hydrolyzed Wheat Protein/Dimethicone PEG-7 Acetate
- Hydrolyzed Wheat Protein/Dimethicone PEG-7 Phosphate Copolymer
- Hydrolyzed Wheat Protein/PEG-20 Acetate Copolymer
- Hydrolyzed Wheat Protein/PVP Crosspolymer
- Hydroxypropyltrimonium Hydrolyzed Wheat Protein
- Hydroxypropyltrimonium Hydrolyzed Wheat Protein/Siloxysilicate
- Laurdimonium Hydroxypropyl Hydrolyzed Wheat Protein
- Olivoyl Hydrolyzed Wheat Protein
- Palmitoyl Hydrolyzed Wheat Protein
- PG-Hydrolyzed Wheat Protein
- Potassium Cocoyl Hydrolyzed Wheat Protein
- Potassium Olivoyl Hydrolyzed Wheat Protein
- Potassium Palmitoyl Hydrolyzed Wheat Protein
- Potassium Undecylenoyl Hydrolyzed Wheat Protein
- Propyltrimonium Hydrolyzed Wheat Protein
- Quaternium-79 Hydrolyzed Wheat Protein
- Sodium Capryloyl Hydrolyzed Wheat Protein
- Sodium Cocoyl Hydrolyzed Wheat Protein
- Sodium Cocoyl Hydrolyzed Wheat Protein Glutamate
- Sodium Palmitoyl Hydrolyzed Wheat Protein
- Sodium Stearoyl Hydrolyzed Wheat Protein
- Sodium/TEA-Undecylenoyl Hydrolyzed Wheat Protein
- Soyamidoethyltrimonium/Trimonium Hydroxypropyl Hydrolyzed Wheat Protein
- Soydimonium Hydroxypropyl Hydrolyzed Wheat Protein
- Steardimonium Hydroxypropyl Hydrolyzed Wheat Protein

- Sulfhydryl Modified Hydrolyzed Wheat Protein
- Trimethylsilyl Hydrolyzed Wheat Protein PG-Propyl Methylsilanediol Crosspolymer
- Wheat Germamidopropyl Dimonium Hydroxypropyl Hydrolyzed Wheat Protein
- Wheatgermamidopropyl Dimethylamine Hydrolyzed Wheat Protein
- Zinc Undecylenoyl Hydrolyzed Wheat Protein

Of 196 hair conditioners in CAMP, 33 (16.8%) contained hydrolyzed wheat protein. Of 265 shampoos in CAMP, 31 (11.7%) contained hydrolyzed wheat protein. Of 290 hair styling products, 42 (14.5%) contained hydrolyzed wheat protein.

### **Lavandula angustifolia (Lavender) Extract and Oil**

Lavender oil is obtained from the flowers of the Mediterranean evergreen shrub, *Lavandula angustifolia*. Dried lavender boughs are used indoors to deter moths and flies. The oil is used for flavoring drinks, sweets, and chewing gum. It is widely used in herbal medicine and in traditional medical settings as aromatherapy for its calming properties.<sup>29</sup>

De Groot and Schmidt documented more than 450 chemicals in lavender and summarized more than 40 publications involving lavender sensitivity.<sup>31</sup> The main allergens are likely caryophyllene, linalyl acetate, and linalool.<sup>31</sup> The range of positivity to lavender in 3 studies involving 8,953 patients from 2002-2012 was 0.1-1.2%.<sup>31</sup> The NACDG reported a frequency of 0.32% in almost 14,000 patients.<sup>36</sup>

*Personal experience:* I have patch tested approximately 1,000 individuals to lavender with at least 30 positive reactions. I have also had positive reactions to pure lavender extract.<sup>30</sup> Almost all cases are clinically relevant.

*CAMP:* Lavender is not listed in CAMP as a specific allergen. It is considered a member of the fragrance/botanical family. Thus, extensive cross-reactions would eliminate all fragrance materials as listed above under the section “fragrance”. Using the advanced search function (which does not capture all synonyms and cross-reactors), the following specific to lavender was found:

- Lavandula Angustifolia (Lavender)
- Lavandula Angustifolia (Lavender) Extract
- Lavandula Angustifolia (Lavender) Flower
- Lavandula Angustifolia (Lavender) Flower Extract
- Lavandula Angustifolia (Lavender) Flower Powder
- Lavandula Angustifolia (Lavender) Flower Water
- Lavandula Angustifolia (Lavender) Flower Wax
- Lavandula Angustifolia (Lavender) Flower/Leaf Stem Extract

- Lavandula Angustifolia (Lavender) Flower/Leaf/Stem Extract
- Lavandula Angustifolia (Lavender) Oil
- Lavandula Angustifolia (Lavender) Water
- Lavandula Angustifolia Extract (Lavender)
- Lavandula Angustifolia Flower Extract (Lavender)
- Lavandula Angustifolia Oil (Lavender Oil)
- Lavandula Hybrida (Lavender) Oil
- Lavandula Spica (Lavender) Flower Oil
- Lavandula Spica (Lavender) Flower/Leaf/Stem Extract
- Lavender
- Lavender Extract
- Lavandula Angustifolia (Lavender)
- Lavandula Angustifolia (Lavender) Flower/Leaf/Stem Extract
- Odontioda Lavender Lace Flower Extract

Of 196 hair conditioners in CAMP, 4 (0.2%) contained lavender. Of 265 shampoos in CAMP, 6 (1.1%) contain lavender. Of 290 hair styling products, 4 (1.4%) contain lavender.

## **Menthol**

Menthol is a diterpene alcohol. It is used as an analgesic, flavoring agent, fragrance, denaturant and conditioning agent. Peppermint is the essential oil from *Mentha x peiperita* L. leaves. It is cultivated in many parts of the world and prized for its soothing digestive properties. Peppermint oil contains more than 30 known compounds including menthyl acetate, menthofuran, eucalyptol, limonene and menthol.<sup>31</sup> The major allergens are caryophyllene, limonene, menthol,  $\alpha$ -pinene, piperitone, and pulegone. Because of its high menthol content, it is used as flavoring agent in beverages, sweets, chewing gum and oral hygiene products.

A review by DeGroot found over 45 publications documenting sensitivity to peppermint oil,<sup>32</sup> especially in oral hygiene materials.<sup>33 34 35</sup> The range of positivity to peppermint oil in 10 studies involving 14,326 patients from 1970-2012 was 0.3-1.8%. The prevalence of peppermint extract sensitivity in almost 14,000 patients tested by the NACDG was 0.5%.<sup>36</sup>

*Personal Experience:* I have patch tested approximately 1,000 patients to peppermint extract<sup>30</sup> (through NACDG – approx. 0.5% positivity) and approximately 1,500 to menthol with approximately <0.1% positivity. It is a recognized, but rare, allergen.<sup>37</sup> I see it mostly in oral care products and anti-itch lotions.



*CAMP*: Because menthol is not recognized as a common allergen, no cross-reactors are defined specifically for menthol in *CAMP*. Cross-reactors for peppermint include menthol as well as all the below:

- Essential Oil of Peppermint
- Mentha Herba (Peppermint) Callus Culture Extract
- mentha piperita
- Mentha Piperita (Peppermint)
- Mentha Piperita (Peppermint) Extract
- Mentha Piperita (Peppermint) Flower/Leaf/Stem Extract
- Mentha Piperita (Peppermint) Flower/Leaf/Stem Water
- Mentha Piperita (Peppermint) Leaf
- Mentha Piperita (Peppermint) Leaf Extract
- Mentha Piperita (Peppermint) Leaf Extract (Peppermint)
- Mentha Piperita (Peppermint) Leaf Juice
- Mentha Piperita (Peppermint) Leaf Oil
- Mentha Piperita (Peppermint) Leaf Oil (peppermint)
- Mentha Piperita (Peppermint) Leaf Water
- Mentha Piperita (Peppermint) Oil
- Mentha Piperita Leaf Extract (Peppermint)
- Mentha Piperita Oil (Peppermint Oil)
- Menthol
- Oil of Peppermint
- Peppermint
- Peppermint Extract
- Peppermint Leaf Extract
- Peppermint Oil

Of 211 hair conditioners in *CAMP*, 18 (8.5%) contained peppermint-related ingredients. Of 278 shampoos in *CAMP*, 14 (5.0%) contained peppermint-related ingredients. Of 333 hair styling products, 7 (2.1%) contained peppermint-related ingredients.

### **Methylchloroisothiazolinone and Methylisothiazolinone**

Methylchloroisothiazolinone/methylisothiazolinone (MCI/MI), marketed as Kathon CG, is a 3:1 combination preservative which was introduced in the 1980s primarily for industrial applications. In the U.S., it is permitted in wash-off products at a concentration of 15 ppm. The allergenicity of MCI/MI was first reported in the early 1980s and, of the two components, MCI was found to be a more potent sensitizer by guinea pig maximization test (GPMT).<sup>38</sup> Reports of

occupational ACD were reported in 1985, and by the late 1980s, isothiazolinone contact allergy was declared a European epidemic in Lancet by de Groot and co-authors.<sup>39</sup>

MI as a mono-preservative was introduced into industrial products in 2000 and into consumer products in 2005 at concentrations of up to 100ppm.<sup>40</sup> This represents a 25-fold increase in total MI concentration. The first cases of MI ACD in Europe were reported by Isaksson et. al. in 2004<sup>41</sup> and Thyssen et. al. in 2006.<sup>42</sup> Increasing prevalence of allergy to isothiazolinones led to MI being named The American Contact Dermatitis Society Contact Allergen of the Year in 2013<sup>43</sup> to raise awareness of the increasing use in consumer products and increasing prevalence of allergy to this compound. The NACDG recently reported that, of 4860 patients patch tested, 6.3% reacted to MCI/MI 0.01% aqueous (aq) and 10.7% reacted to MI 0.2% aq. These two isothiazolinones were the most common preservative allergens in the 2013-2014 study cycle; 11.9% of patch tested individuals reacted to one or both isothiazolinones.<sup>44</sup>

Our experience in North America follows that of Europe. A Swedish study demonstrated an increase in isothiazolinone allergy prevalence from 2.7% in 2003 to 7.6% in 2012.<sup>45</sup> Similar studies in the United Kingdom, France, Belgium, and Germany also documented recent increases and high prevalences.<sup>46</sup> Alarmingly, a Thai study documented that isothiazolinone allergy increased from 4.8% in 2009 to 17% in 2013.<sup>47</sup>

The old dogma that wash-off products cause less allergic contact dermatitis than leave-on products does not seem to be true for MCI and MI. There are many reports of ACD caused by wash-off products containing isothiazolinones, including liquid soaps, industrial hand cleaners,<sup>48</sup> and shampoos.<sup>49</sup>

*Personal experience:* Approximately 10% of individuals I patch test have positive reactions to MCI/MI and/or MI. Almost all are clinically relevant. Many also test positive to their products containing these ingredients. I have had also had many (>30) specific reactions to shampoos (tested semi-open) due to MCI/MI or MI. This is a major allergen which is causing an epidemic of sensitization in North America currently.

*CAMP:* Cross reactors in CAMP for MCI and MI include:

- 2-n-Octyl-4-isothiazolin-3-one
- Chloromethylisothiazalone
- Cl Me-Isothiazolinone (Kathon CG)
- Cl+Me-Isothiazolinone (MCI/MI)
- Kathon CG
- MCI/MI
- Me-Cl-Isothiazolinone
- Methychloroisothiazolinone

- Methyl-4-Isothiazolin-3-One
- methylchloroisothiazinolone / methylisothiazinolone
- Methylchloroisothiazolinone
- Methylisothiazolinone
- proteasemethylisothiazolinone

Of 211 hair conditioners in CAMP, 101 (47.9%) contained MCI/MI-related ingredients. Of 278 shampoos in CAMP, 153 (55.0%) contained MCI/MI-related ingredients. Of 333 hair styling products, 31 (9.3%) contained MCI/MI-related ingredients.

### **Panthenol (Pro-Vitamin B5)**

Panthenol is the alcohol analog of pantothenic acid (vitamin B<sub>5</sub>). Panthenol is used as a moisturizer and humectant. It has been used in ointments, lotions, shampoos, nasal sprays, eye drops, lozenges, and cleaning solutions for contact lenses.

In ointments, it is used for the treatment of mild burns, minor skin injuries and disorders. It is a common component of hair products because it binds to the hair shaft readily. It coats the hair shaft, giving it a shiny appearance.

Panthenol has been reported to cause allergic contact dermatitis. A literature review found several cases of sensitivity due to panthenol<sup>50 51 52 53 54</sup> including a case of contact urticaria from panthenol in a shampoo.<sup>55</sup>

*Personal Experience:* I have not patch tested to panthenol. It is not available as a commercial allergen for testing.

*CAMP:* Cross-reactors listed for panthenol include:

- dexpanthenol
- Dimethiconol Panthenol
- D-Panthenol
- Panthenol
- Panthenol (Pro Vitamin B5 Complex)
- Panthenol (Pro Vitamin B5)
- Panthenol (Pro Vitamin B5)
- Panthenol (Provitamin B5)
- Panthenol (Pro-Vitamin B5)
- Panthenol (Pro-Vitamin B-5)
- panthenol (vit. b-5)

- Panthenol (Vitamin B5)
- Silicone Quaternium-2 Panthenol Succinate
- TriPABA Panthenol
- Vitamin B5

Of 211 hair conditioners in CAMP, 82 (38.9%) contained panthenol-related ingredients. Of 278 shampoos in CAMP, 85 (30.6%) contained panthenol-related ingredients. Of 333 hair styling products, 72 (21.6%) contained panthenol-related ingredients.

### **PEG-60 Almond Glycerides**

PEG-60 almond glyceride is a polyethylene glycol derivative of the mono- and diglycerides from almond oil with ethylene oxide. Its functional classes include alkoxylated alcohols (ethers formed from the reaction of an alcohol with an alkylene oxide such as ethylene oxide) and glyceryl esters (fatty acid esters). These classes function as emollients, lubricants, emulsifiers, thickening agents, surfactants, solubilizers, and conditioners.

A literature search found no reports of contact dermatitis to PEG-60 almond glycerides. It is not available as a commercial allergen for testing.

*Personal Experience:* I have no experience patch testing with PEG-60 almond glycerides. I have patch tested to polyethylene glycol (approximately 3000 patients) as well as sweet almond oil (approximately 50 patients). Both are rare sensitizers (in my experience, approximately <0.1% to PEG and no reactions to sweet almond oil).

*CAMP:* Because it is an unrecognized allergen, PEG-60 almond glycerides do not have any cross-reactors listed in CAMP. CAMP also does not provide any cross reactors for polyethylene glycol or almond. Using an advanced search function for the specific ingredient PEG-60 almond glyceride the following results were obtained: Of 211 hair conditioners in CAMP, 0 (0%) contained PEG-60 almond glycerides. Of 278 shampoos in CAMP, 5 (1.8%) contained PEG-60 almond glycerides. Of 333 hair styling products, 3 (0.9%) contained PEG-60 almond glycerides.

### **Persea gratissima (Avocado) Oil**

While type I (immediate type hypersensitivity) to avocado is well known and associated with latex allergy and sensitivity to other foods (bananas, melons, mango, chestnuts, and kiwis), a literature search found only one report of allergic contact dermatitis (delayed type hypersensitivity) due to avocado oil.<sup>56</sup>

*Personal experience:* I have only patch tested approximately 5 individuals to avocado oil with no positive reactions.

*CAMP:* Avocado oil is not listed in CAMP as a specific allergen. Using the advanced search function (which does not capture all synonyms and cross-reactors), the following was found:

- Avocado Oil
- Avocado Oil Glycereth-8 Esters
- Avocado Oil PEG-11 Esters
- Avocado Oil PEG-8 Esters
- Avocado Oil Propylene Glycol Esters
- Hydrogenated Avocado Oil

Of 196 hair conditioners in CAMP, 0 (0%) contained avocado oil. Of 265 shampoos in CAMP, 1 (0.3%) contain avocado oil. Of 290 hair styling products, 1 (0.3%) contained avocado oil.

### **Polysorbate-60**

Polysorbate 60 is a sorbitan derivative. It is mixture of stearate esters of sorbitol and sorbitol anhydrides, consisting predominantly of the monoester, condensed with approximately 20 moles of ethylene oxide. Polysorbates are water soluble. Sorbitan derivatives as a class are widely used emulsifiers, stabilizers, and suspending agents.

There are a few case reports of polysorbates causing contact urticaria.<sup>57 58</sup> Sorbates and sorbic acid are recognized contact urticants and allergens.<sup>59 60 61 62 63 64</sup> Because it is a rare cause of allergic contact dermatitis, it is on not on the NACDG screening series.

*Personal experience:* I have no experience patch testing with polysorbate-60. I have patch tested approximately 3000 individuals to sorbic acid with approximately <0.1% positive reactions. I commonly see non-immunologic contact urticaria reactions to sorbic acid.

*CAMP:* Polysorbates are not listed in CAMP separately but are listed in the cross-reactor list for sorbic acid. The full cross-reactor list for sorbic acid includes:

- Calcium Sorbate
- Hydroxypropyl Dimethicone/Polysorbate-20 Crosspolymer
- Isopropyl Sorbate
- Ozonized Polysorbate 80
- PEG-8 Dimethicone/Polysorbate 20 Crosspolymer
- Polysorbate 60

- Polysorbate
- Polysorbate 20
- Polysorbate 21
- Polysorbate 60
- Polysorbate 61
- Polysorbate 65
- Polysorbate 80
- Polysorbate 80 Acetate
- Polysorbate 81
- Polysorbate 85
- Polysorbate-20
- Polysorbate-21
- Polysorbate-40
- Polysorbate-60
- Polysorbate-61
- Polysorbate-80
- Polysorbate-85
- Potassium Sorbate
- Potassium Sorbate
- Potassium Sorbate
- Sodium Sorbate
- Sorbic Acid
- Sorbic Acid (A Preservative)
- TEA-Sorbate

Of 211 hair conditioners in CAMP, 40 (19.0%) contained sorbic acid cross-reactors including polysorbates. Of 278 shampoos in CAMP, 39 (14.0%) contained sorbic acid cross-reactors including polysorbates. Of 333 hair styling products, 56 (16.8%) contained sorbic acid cross-reactors including polysorbates.

### **Prunus amygdalus dulcis (Sweet Almond) Oil**

Almonds are seeds of the *Prunus dulcis*, syn. *Prunus amygdalus* tree which is native to the Middle East, the Indian subcontinent and North Africa. Almond oil contains omega-9 fatty acids, linoleic acid, and saturated fatty acids. The oil can be prepared from either sweet or bitter almonds and is a glyceryl oleate, with a slight odour and a nutty taste. Sweet almond oil is obtained from the dried kernel of sweet almonds and is used as a skin emollient.

While type I (immediate type hypersensitivity) to almonds is known, a literature search found no reports of allergic contact dermatitis (delayed type hypersensitivity) due to almond oil or almonds.

*Personal experience:* I have patch tested approximately 50 individuals to sweet almond oil with no positive reactions.

*CAMP:* Sweet almond oil is not listed in CAMP as a specific allergen. Using the advanced search function (which does not capture all synonyms and cross-reactors), the following was found:

- Dulcis (Sweet Almond) Seed Extract
- Hydrogenated Sweet Almond Oil
- Hydrogenated Sweet Almond Oil Unsaponifiables
- Hydrolyzed Sweet Almond Protein
- Hydrolyzed Sweet Almond Seedcake
- Polyglyceryl-4 Sweet Almondate
- Potassium Palmitoyl Hydrolyzed Sweet Almond Protein
- Prunus Amygdalus Dulcis (Sweet Almond) Oil
- Prunus Amygdalus Dulcis (Sweet Almond Oil)
- Prunus Amygdalus (Sweet Almond) Protein
- Prunus Amygdalus Dulcis (Sweet Almond) Bark Extract
- Prunus Amygdalus Dulcis (Sweet Almond) Bark Powder
- Prunus Amygdalus Dulcis (Sweet Almond) Bud Extract
- Prunus Amygdalus Dulcis (Sweet Almond) Flower Extract
- Prunus Amygdalus Dulcis (Sweet Almond) Fruit Extract
- Prunus Amygdalus Dulcis (Sweet Almond) Fruit Water
- Prunus Amygdalus Dulcis (Sweet Almond) Oil
- Prunus Amygdalus Dulcis (Sweet Almond) Oil Unsaponifiables
- Prunus Amygdalus Dulcis (Sweet Almond) Oleosomes
- Prunus Amygdalus Dulcis (Sweet Almond) Protein
- Prunus Amygdalus Dulcis (Sweet Almond) Seed Extract
- Prunus Amygdalus Dulcis (Sweet Almond) Seed Meal
- Prunus Amygdalus Dulcis (Sweet Almond) Seed Powder
- Prunus Amygdalus Dulcis (Sweet Almond) Seedcoat Extract
- Prunus Amygdalus Dulcis (Sweet Almond) Seedcoat Powder
- Prunus Amygdalus Dulcis (Sweet Almond) Shell Powder
- Prunus Amygdalus Dulcis Oil (Sweet Almond Oil)
- Prunus Amygdalus Dulcis Oil (Sweet Almond)
- Prunus Amygdalus Dulcis Seed Extract (Sweet Almond)

- Prunus Amygdalus Oil (Sweet Almond)
- Sodium Cocoyl Hydrolyzed Sweet Almond Protein
- Sodium Stearoyl Hydrolyzed Sweet Almond Protein
- Sodium Sweet Almondate
- Sweet almond (Prunus amygdalus dulcis) oil
- Sweet Almond Amino Acids
- Sweet Almond Oil
- Sweet Almond Oil Decyl Esters
- Sweet Almond Seed Extract
- Sweet Almond Seed Meal

Of 196 hair conditioners in CAMP, 14 (7.1%) contained sweet almond ingredients. Of 265 shampoos in CAMP, 6 (2.3%) contain sweet almond ingredients. Of 290 hair styling products, 4 (1.4%) contain sweet almond ingredients.

### **Prunus Serotina (Wild Cherry) Fruit Extract**

Prunus Serotina (Wild Cherry) is commonly called black cherry, wild black cherry, rum cherry, or mountain black cherry. This fruit grows on a deciduous tree common in North America and South America. The seeds and foliage contain compounds that can be converted into cyanide. Unlike the seeds, the fruit does not contain enzymes necessary for conversion into toxic compounds. Wild cherry is sharper in taste than sweet cherries and is used in many foods and drinks.

While type I (immediate type hypersensitivity) to cherry is known, a literature search found no reports of allergic contact dermatitis (delayed type hypersensitivity) due to cherry.

*Personal experience:* I have patch tested approximately 30 individuals to cherry flavor extract with no positive reactions.

*CAMP:* Wild cherry is not listed in CAMP as a specific allergen. Using the advanced search function (which does not capture all synonyms and cross-reactors), the following was found:

- Bitter Cherry Seed Oil PEG-8 Esters
- Cherry Flavor
- Malpighia Glabra (Acerola Barbados Cherry) Fruit Extract
- Malpighia Punicifolia (Acerola Cherry) (Acerola Fruit Extract)
- Prunus Avium (Sweet Cherry) Flower Extract
- Prunus Avium (Sweet Cherry) Fruit Extract



- Prunus Avium (Sweet Cherry) Fruit Juice
- Prunus Avium (Sweet Cherry) Seed Extract
- Prunus Avium (Sweet Cherry) Seed Oil
- Prunus Avium (Sweet Cherry) Seed Powder
- Prunus Avium (Sweet Cherry) Shell Powder
- Prunus Avium (Sweet Cherry) Wood Extract
- Prunus Cerasus (Bitter Cherry) Bud Extract
- Prunus Cerasus (Bitter Cherry) Extract
- Prunus Cerasus (Bitter Cherry) Flower Extract
- Prunus Cerasus (Bitter Cherry) Fruit
- Prunus Cerasus (Bitter Cherry) Fruit Extract
- Prunus Cerasus (Bitter Cherry) Juice
- Prunus Cerasus (Bitter Cherry) Leaf Extract
- Prunus Cerasus (Bitter Cherry) Seed Oil
- Prunus Cerasus (Bitter Cherry) Shell Powder
- Prunus Cerasus (Bitter Cherry) Stalk Extract
- Prunus Serotina (Wild Cherry) Bark
- Prunus Serotina (Wild Cherry) Bark Extract
- Prunus Serotina (Wild Cherry) Fruit Extract
- Prunus Serotina (Wild Cherry) Juice
- Prunus Serrulata (Cherry) Flower Extract
- Prunus Serrulata Flower Extract (Japanese Cherry)
- Wild cherry (Prunus serotina) bark extract

Of 196 hair conditioners in CAMP, 3 (1.5%) contained cherry-derived ingredients. Of 265 shampoos in CAMP, 4 (1.5%) contained cherry-derived ingredients. Of 290 hair styling products, 8 (2.8%) contained cherry-derived ingredients.

### **Punica granatum (Pomegranate) Extract**

The pomegranate is the fruit of *Punica granatum*, a tree native to southwest Asia and widely cultivated in the Mediterranean. While type I (immediate type) hypersensitivity to pomegranates has been rarely reported,<sup>65</sup> a literature search found no reports of allergic contact dermatitis (delayed type hypersensitivity) due to pomegranate.

*Personal experience:* I have no experience patch testing with pomegranate extract.

*CAMP:* Pomegranate is not listed in CAMP as a specific allergen. Using the advanced search function (which does not capture all synonyms and cross-reactors), the following was found:

- Pomegranate Extract
- Pomegranate Fruit Peel Extract Octenylsuccinate
- Pomegranate Seed Oil
- Punica Granatum (Pomegranate) Extract
- Punica Granatum (Pomegranate) Fruit Extract
- Punica Granatum (Pomegranate) Seed Oil

Of 196 hair conditioners in CAMP, 0 (0%) contained pomegranate ingredients. Of 265 shampoos in CAMP, 1 (0.3%) contained pomegranate ingredients. Of 290 hair styling products, 1 (0.3%) contained pomegranate ingredients.

### **Rosmarinus Officinalis (Rosemary) Leaf Extract**

*Rosmarinus officinalis* (rosemary), is a perennial herb with fragrant, evergreen, needle-like leaves and white, pink, purple, or blue flowers. Rosemary oil is used as a fragrance in perfumes, hair products, personal care products and cleaning products. It is used in herbal medicine for a variety of ailments including memory loss.

There have been several case reports of allergic contact dermatitis to rosemary.<sup>66 67 68 69 70 71 72</sup> It is a rare sensitizer and thus not part of the NACDG screening series. The major allergens in rosemary oil include 1,8-Cineole,  $\alpha$  pinene, camphor, camphene, borneol,  $\beta$ -pinene, and limonene.<sup>73</sup>

*Personal experience:* I have patch tested approximately 200 individuals to rosemary extract with no positive reactions.

*CAMP:* Rosemary is not listed in CAMP as a specific allergen. Using the advanced search function (which does not capture all synonyms and cross-reactors), the following was found:

Of 211 hair conditioners in CAMP, 23 (10.9%) contained rosemary. Of 278 shampoos in CAMP, 13 (4.7%) contained rosemary. Of 333 hair styling products, 13 (3.9%) contained rosemary.

### **Stearamidopropyl Dimethylamine**

Stearamidopropyl dimethylamine is also known as amidoamine, octadecanoylamidopropyldimethylamine, dimethylaminopropyl stearamide, or stearic acid 3-dimethyl aminopropylamide. It is used as an antistatic agent and hair conditioning agent to enhance the appearance, body, sheen and styling of hair. Amidoamine is a by-product in the

production of the sudsing agent cocamidopropyl betaine (CAPB) from coconut.<sup>74</sup> Amidoamine may be present in any product that contains CAPB. It is found in most shampoos, bath gels, bar soaps, and liquid soaps.

Allergic contact dermatitis to stearamidopropyl dimethylamine is well-known.<sup>75</sup> In the most recent NACDG report, of 4859 individuals patch tested to this chemical, there were 58 (1.2%) reactions.<sup>7</sup>

*Personal experience:* I have patch tested approximately 3,000 individuals to stearamidopropyl dimethylamine with many relevant reactions, commonly to hair products. We have also conducted clinical trials with this chemical.<sup>76 77</sup>

*CAMP:* The following cross-reactors are listed for stearamidopropyl dimethylamine:

- 2-ethylhexyl-4-dimethylaminobenzoate
- 3-(Dimethylamino)propylamine
- Acrylates/ Dimethylaminoethyl Methacrylate Copolymer
- Acrylates/Dimethylaminoethyl Methacrylate Copolymer
- Adipic Acid/Dimethylaminohydroxypropyl Diethylenetriamine Copolymer
- Alkyldimethylamine Oxide
- Almondamidopropyl Betaine
- Almondamidopropyl Dimethylamine
- Amidoamine
- amidoamine (stearamidopropyl dimethylamine)
- AMP-Acrylates/Dimethylaminoethylmethacrylate Copolymer
- Apricotamidopropyl Betaine
- Avocadamidopropyl Betaine
- Avocadamidopropyl Dimethylamine
- Babassuamidopropyl Betaine
- Babassuamidopropyl Dimethylamine
- Behenamidopropyl Betaine
- Behenamidopropyl Dimethylamine
- Behenamidopropyl Dimethylamine (Kape Seed Oil)
- Behenamidopropyl Dimethylamine Behenate
- Behenamidopropyl Dimethylamine Lactate
- Behenyl Betaine
- Betaine
- Betaine (Sugar Beet)
- Betaine Anhydrous

- Betaine Salicylate
- Brassicamidopropyl Dimethylamine
- Butyl Methacrylate/DMAPA Acrylates/Vinylacetamide Crosspolymer
- Canolamidopropyl Betaine
- Capryl/Capramidopropyl Betaine
- Carnitine
- Carnitine HCl
- Carnitine Hydroxycitrate
- Carnitine Isomerized Linoleate
- Carnitine PCA
- Cetyl Betaine
- Cetyldimethylamine Hydrolyzed Hempseedate
- Cocamidoethyl Betaine
- Cocamidoprophyl betaine
- Cocamidopropyl Betaine
- Cocamidopropyl Betaine (Coconut Derived)
- Cocamidopropyl Betaine (Coconut Oil)
- Cocamidopropyl Dimethylamine
- Cocamidopropyl Dimethylamine Dihydroxymethylpropionate
- Cocamidopropyl Dimethylamine Hydrolyzed Collagen
- Cocamidopropyl Dimethylamine Lactate
- Cocamidopropyl Dimethylamine Propionate
- Cocamidopropyl Dimethylaminohydroxypropyl Hydrolyzed Collagen
- Cocamidopropyl Hydroxysultaine
- Cocamidopropyl Hydroxysultaine (Cocunut/Palm Kernel Derived)
- Cocamidopropylbetaine
- Cocamidopropylene Oxide
- Coco/Oleamidopropyl Betaine
- Coco/Sunfloweramidopropyl Betaine
- Cocoamidopropyl Betaine
- Coco-Betaine
- Coco-Hydroxysultaine
- Coco-Sultaine
- Cupuassuamidopropyl Betaine
- Decyl Betaine
- Dibehenamidopropyldimethylamine Dilinoleate
- Dicocodimethylamine Dilinoleate
- Dilinoleamidopropyl Dimethylamine

- Dilinoleamidopropyl Dimethylamine Dimethicone PEG-7 Phosphate
- Dimer Dilinoleamidopropyl Dibetaine
- Dimethicone Propyl PG-Betaine
- Dimethylamine/Ethylenediamine/Epichlorohydrin Copolymer
- Dimethylamino Methylpropanol
- Dimethylaminoethanol Tartrate
- Dimethylaminoethyl Cetearate
- Dimethylaminoethyl Methacrylate
- Dimethylaminoethyl Rice Branate
- Dimethylaminoethylmethacrylate/HEMA/Lauryl Methacrylate Copolymer
- Dimethylaminopropylamido PCA Dimethicone
- Dimethylaminopropylamine
- dimethylaminopropylamine (DMAPA)
- Dimethylaminopropylamino Hypocrellin B
- Dimethylaminostyryl Heptyl Methyl Thiazolium Iodide
- Distearyl dimethylamine Dilinoleate
- DMAPA
- DMAPA Acrylates/Acrylic Acid/Acrylonitrogens Copolymer
- Erucamidopropyl Hydroxysultaine
- Ethyl Dimethylaminobenzoate
- Formamidopropyl Betaine
- Glyceryl Betaine/Polyacrylic Acid Esters
- Hydrogenated Tallow Betaine
- Hydroxylauryl/Hydroxymyristyl Betaine
- Hydroxysultaines
- Isostearamidopropyl Betaine
- Isostearamidopropyl Dimethylamine
- Isostearamidopropyl Dimethylamine Gluconate
- Isostearamidopropyl Dimethylamine Glycolate
- Isostearamidopropyl Dimethylamine Lactate
- Lauramido Propyl Betaine
- Lauramidopropyl Betaine
- Lauramidopropyl Dimethylamine
- Lauramidopropyl Dimethylamine Oxide/Myristamidopropyl Amine Oxide
- Lauramidopropyl Dimethylamine Propionate
- Lauramidopropyl Hydroxysultaine
- Lauryl Betaine
- Lauryl Dimethylamine Cyclocarboxypropylolate

- Lauryl Hydroxysultaine
- Lauryl Sultaine
- Levocarnitine
- Linoleamidopropyl Dimethylamine
- Linoleamidopropyl Dimethylamine Dimer Dilinoleate
- m-Dimethylaminophenyl Urea
- Meadowfoamamidopropyl Betaine
- Methacryloyl Ethyl Betaine/Acrylates Copolymer
- Methoxycinnamidopropyl Hydroxysultaine
- Milkamidopropyl Betaine
- Minkamidopropyl Betaine
- Minkamidopropyl Dimethylamine
- Myristamidopropyl Betaine
- Myristamidopropyl Dimethylamine
- Myristamidopropyl Dimethylamine Phosphate
- Myristamidopropyl Hydroxysultaine
- Myristyl Betaine
- Myristylamidopropyl Dimethylamine Dimethicone PEG-7 Phosphate
- Oatamidopropyl Betaine
- Oatamidopropyl Dimethylamine
- Oleamidopropyl Betaine
- Oleamidopropyl Dimethylamine
- Oleamidopropyl Dimethylamine Glycolate
- Oleamidopropyl Dimethylamine Hydrolyzed Collagen
- Oleamidopropyl Dimethylamine Lactate
- Oleamidopropyl Dimethylamine Propionate
- Oleamidopropyl Hydroxysultaine
- oleamidopropyl dimethylamine
- Oleyl Betaine
- Olivamidopropyl Betaine
- Olivamidopropyl Dimethylamine
- Olivamidopropyl Dimethylamine Lactate
- Palm Kernelamidopropyl Betaine
- Palmamidopropyl Betaine
- Palmitamidopropyl Betaine
- Palmitamidopropyl Dimethylamine
- Palmitamidopropyl Dimethylamine Lactate
- Palmitamidopropyl Dimethylamine Propionate

- Palmitic Betaine
- Palmitoleamidopropyl Dimethylamine Lactate
- Palmitoleamidopropyl Dimethylamine Propionate
- Palmitoyl Carnitine
- Polydimethylaminoethyl Methacrylate
- Polyhydroxystearamidopropyl Dimethylamine
- Polymethacryloyl Ethyl Betaine
- Polytetrafluoroethylene Acetoxypropyl Betaine
- PVP/DMAPA Acrylates CoPolymer
- PVP/DMAPA Acrylates Co-Polymer
- Ricinoleamidopropyl Betaine
- Ricinoleamidopropyl Dimethylamine
- Ricinoleamidopropyl Dimethylamine Lactate
- Sesamidopropyl Betaine
- Sesamidopropyl Dimethylamine
- Shea Butteramidopropyl Betaine
- Soyamidopropyl Betaine
- Soyamidopropyl Dimethylamine
- Stearamidopropyl Betaine
- Stearamidopropyl Dimethylamine
- Stearamidopropyl Dimethylamine (\*Mixed Plant)
- Stearamidopropyl Dimethylamine (Mixed Plant)
- Stearamidopropyl Dimethylamine Lactate
- Stearamidopropyl Dimethylamine Stearate
- Stearoxypropyl Dimethylamine
- Stearyl Betaine
- Stearyl PG-Dimethylamine
- Sunflowerseedamidopropyl Dimethylamine
- Sunflowerseedamidopropyl Dimethylamine Lactate
- Sunflowerseedamidopropyl Dimethylamine Malate
- Tallamidopropyl Dimethylamine
- Tallow Betaine
- Tallow Dihydroxyethyl Betaine
- Tallowamidopropyl Betaine
- Tallowamidopropyl Dimethylamine
- Tallowamidopropyl Hydroxysultaine
- Thioctamidoethyl Dimethylamine Maleate
- Triticum Vulgare (Wheat Germ) Amidopropyl Dimethylamine Hydrolyzed Protein

- Undecylenamidopropyl Betaine
- Vinyl Caprolactam/VP/Dimethylaminoethyl Methacrylate Copolymer
- VP/ Dimethylaminoethylmethacrylate Copolymer
- VP/Dimethylaminoethylmethacrylate Copolymer
- VP/DMAPA Acrylates Copolymer
- Wheat Germamidopropyl Betaine
- Wheat Germamidopropyl Dimethylamine
- Wheat Germamidopropyl Dimethylamine Lactate
- Wheatgeramidopropyl Dimethylamine Hydrolyzed Collagen
- Wheatgeramidopropyl Dimethylamine Hydrolyzed Wheat Protein

Of 211 hair conditioners in CAMP, 72 (34.1%) contained stearamidopropyl dimethylamine-related chemicals. Of 278 shampoos in CAMP, 204 (73.4%) contained stearamidopropyl dimethylamine-related chemicals. Of 333 hair styling products, 44 (13.2%) contained stearamidopropyl dimethylamine-related chemicals.

### **Tetrasodium EDTA**

EDTA salts are chelating agents and preservatives commonly used in personal products, topical medications, and ophthalmic and otic solutions. It is also found in foods.

Several EDTA salts (disodium, trisodium and tetrasodium) have been reported to cause positive patch test reactions and several clinically relevant cases have been reported. Raymond and Gross reported three cases including a man with periorbital vesicular dermatitis due to EDTA in two different ophthalmic solutions.<sup>78</sup> De Groot reported a patient with recurrent leg ulcers who developed a widespread dermatitis after use of a EDTA-containing topical corticosteroid; patch testing was only positive to the corticosteroid product and EDTA.<sup>79</sup> Bhushan and Beck reported a man with facial swelling after dental procedures who had a positive patch test reaction to EDTA, present in the dental anesthetic.<sup>80</sup> Kimura and Kawada reported a woman with facial dermatitis due to EDTA in a cosmetic lotion.<sup>81</sup> Soga reported a woman with scalp, face, and neck dermatitis who was patch test positive to EDTA as well as three EDTA-containing products (lotion, cream and shampoo).<sup>82</sup> We also reported a woman with severe facial allergic contact dermatitis attributed to EDTA in two hair products and an eye drop.<sup>83</sup>

*Personal experience:* I have patch tested approximately 4000 individuals EDTA with approximately 20 positive reactions.

*CAMP:* The following are listed as cross-reactors with EDTA in CAMP:

- Alkoxylated Ethylenediamine



- Bis-Dioctadecylamide Dimer Dilinoleic Acid/Ethylenediamine Copolymer
- Bis-Hydrogenated Tallow Amine Dilinoleic Acid/Ethylenediamine Copolymer
- Bis-Stearyl Ethylenediamine/Neopentyl Glycol/Hydrogenated Dimer Dilinoleate Copolymer
- Bis-Stearyl Ethylenediamine/Neopentyl Glycol/Stearyl Hydrogenated Dimer Dilinoleate Copolymer
- Calcium Disodium EDTA
- Diammonium EDTA
- Dihydrate Edetate Disodium
- Dilinoleic Acid/Ethylenediamine Copolymer
- Dilinoleic Acid/Sebacic Acid/Piperazine/Ethylenediamine Copolymer
- Dimer Dilinoleate/Ethylenediamine Copolymer Acetate
- Dimethicone Propylethylenediamine Behenate
- Dimethylamine/Ethylenediamine/Epichlorohydrin Copolymer
- Dipotassium EDTA
- Disodium EDTA
- Disodium Edetate
- Disodium EDTA
- Disodium EDTA Dihydrate
- Disodium EdtaAmmonium Polyacrylate
- Disodium EDTA-Copper
- Edetate Disodium
- Edetate Disodium (EDTA)
- Edetate Disodium Dihydrate
- EDTA (Ethylenediamine-Tetra-Acetic Acid)
- EDTA Disodium
- EDTA-sodium
- Ethoxylated/Propoxylated Ethylenediamine
- Ethylenediamine
- Ethylenediamine Dihydrochloride
- Ethylenediamine/Dimer Tallate Copolymer Bis-Hydrogenated Tallow Amide
- Ethylenediamine/Hydrogenated Dimer Dilinoleate Copolymer Bis-Di-C14-18 Alkyl Amide
- Ethylenediamine/Stearyl Dimer Dilinoleate Copolymer
- Ethylenediamine/Stearyl Dimer Tallate Copolymer
- Ethylenediamine/Stearyl Dimerdilinoate Copolymer
- Ethylenediaminetetraacetic Acid
- Ethylenediamine-Tetra-Acetic Acid
- Ethylenediamine-Tetra-Acetic Acid (EDTA)

- HEDTA
- Hydroxypropyl Ethylenediamine Carbomer
- Lauroyl Ethylenediamine Triacetic Acid
- Nonanoyl Ethylenediaminetriacetic Acid
- Pentasodium Ethylenediamine Tetramethylene Phosphonate
- Sodium Dicoylethylenediamine PEG-15 Sulfate
- Sodium EDTA
- Sodium Lauroyl Ethylenediamine Triacetate
- TEA-EDTA
- Tetrasodium EDTA
- Tetrahydroxyethyl Ethylenediamine
- Tetrahydroxypropyl Ethylenediamine
- Tetrahydroxypropyl Ethylenediamine Dioleate
- Tetrasodium EDTA
- Tetrasodium EDTA
- tetrasodium EDTA
- Tripotassium EDTA
- Trisodium EDTA
- Trisodium Ethylenediamine Disuccinate
- Trisodium HEDTA

Of 196 hair conditioners in CAMP, 86 (43.9%) contained EDTA-related ingredients. Of 265 shampoos in CAMP, 139 (52.5%) contain EDTA-related ingredients. Of 290 hair styling products, 72 (24.8%) contain EDTA-related ingredients.

### **Triticum Vulgare (Wheat) Starch**

Triticum Vulgare (Wheat) Starch is a starch obtained from wheat, *Triticum vulgare*.

Carbohydrates are used in personal care products as abrasives, absorbents, binders, and bulking agents. They also impart viscosity or other textural characteristics to products.

A literature search found no reports of allergic contact dermatitis to wheat starch.

*Personal Experience:* I have no experience patch testing with wheat starch.

*CAMP:* Wheat starch is not a recognized allergen category in CAMP. Using an advanced search function, the following were found listed:

- Hydrolyzed Wheat Starch (Wheat)

- Hydroxypropyltrimonium Hydrolyzed Wheat Starch
- Laurdimonium Hydroxypropyl Hydrolyzed Wheat Starch
- Wheat Starch

Of 196 hair conditioners in CAMP, 6 (3.1%) contained wheat starch. Of 265 shampoos in CAMP, 3 (1.1%) contained wheat starch. Of 290 hair styling products, 5 (1.9%) contained wheat starch.

### **Water**

Water is not a recognized allergen causing delayed type hypersensitivity.

### **Conclusions**

In comparison to other hair cleansing products, there is nothing unique about the ingredients in Wen Sweet Almond Mint, Lavender, and Pomegranate hair cleansers which raises specific concern about these three products. This is based on the above literature and my 20-year patch testing personal experience.

The ingredients with the *highest likelihood* of causing allergic contact dermatitis are methylisothiazolinone and methylchloroisothiazolinone. These isothiazolinones are significant sensitizers, cause severe dermatitis (often from hair cleansing products), and are very difficult to avoid. Approximately half of hair conditioners (48%) and shampoos (55%) in CAMP contain methylisothiazolinone/methylchloroisothiazolinone. Because CAMP preferentially contains a larger number of “low allergen” products, the frequency of this preservative in hair cleansing products is much higher (likely 75-90%). Wen Sweet Almond Mint, Lavender, and Pomegranate hair cleansers, thus, are not uniquely sensitizing by inclusion of this ingredient, and reflect a commonly used preservative in the wider market of hair cleansing products.

The *next most likely sensitizing* ingredient is stearamidopropyl dimethylamine. This is a relatively common allergen but, in my experience, does not cause the severity of dermatitis as seen with methylisothiazolinone/methylchloroisothiazolinone allergy. It is a common ingredient in hair cleansing products; 34% of hair conditioners and 73% of hair shampoos in CAMP contain stearamidopropyl dimethylamine (or cross-reacting chemicals). Wen Sweet Almond Mint, Lavender, and Pomegranate hair cleansers, thus, are not uniquely sensitizing by inclusion of this ingredient, and reflect commonly used surfactants in the wider market of hair cleansing products.


**[REDACTED]**

*Moderate sensitizers* include “fragrance” (in general), lavender, and Compositae plants (Chamomile and Marigold). While fragrance allergy is overall more common than isothiazolinone allergy, most fragrance-allergic individuals can tolerate some fragrance, especially in wash-off products such as hair cleansing products. Cross-reactivity patterns with fragrance/botanical ingredients are also often difficult to predict. Fragrances/botanicals are ubiquitous in hair products; 95% of hair conditioners and shampoos in CAMP contain fragrance materials. Wen Sweet Almond Mint, Lavender, and Pomegranate hair cleansers, thus, are not uniquely sensitizing by inclusion of fragrance/botanical materials, and reflect the industry standard.

Ingredients which have a *low likelihood* of causing sensitization include the following preservatives: cetearyl alcohol, cetyl alcohol, tetrasodium EDTA, and polysorbate-60. These preservatives have low rates of allergic contact dermatitis. They are also frequently found in hair cleansing products. Cetearyl/cetyl alcohol is found in 96% of hair conditioners and 8% of hair shampoos in CAMP. EDTA is found in 44% of hair conditioners and 53% of hair shampoos in CAMP. Sorbates are found in 19% of hair conditioners and 14% of hair shampoos in CAMP. Wen Sweet Almond Mint, Lavender, and Pomegranate hair cleansers, thus, are not uniquely sensitizing by inclusion of these preservatives, and reflect common industry practice.

Other ingredients which have a *low likelihood* of causing allergy include specific botanical agents which could possibly cause problems in individuals allergic to fragrance; these include menthol, sweet almond oil, rosemary, wild cherry, and pomegranate. Menthol was not specifically searchable within CAMP but 9% of hair conditioners and 5% of hair shampoos in CAMP contain peppermint-related ingredients including menthol. Sweet almond oil is an ingredient also found in 7% of hair conditioners and 2% of hair shampoos listed in CAMP. Rosemary is an ingredient also found in 11% of hair conditioners and 5% of hair shampoos listed in CAMP. Wild cherry is an ingredient also found in 2% of hair conditioners and shampoos listed in CAMP. Pomegranate is an ingredient rarely found in hair products; no hair conditioners and 0.3% of hair shampoos listed in CAMP contain pomegranate. While these 5 botanical ingredients are not as commonly found in hair cleansing products as other ingredients, the low sensitization potential makes these unlikely culprits to cause problems for consumers.

The quaternium ammonium compounds (dicetyldimonium chloride and behentrimonium methosulfate) also have *low likelihood* of causing allergy. While allergy to benzalkonium chloride is recognized, specific allergy to dicetyldimonium chloride and behentrimonium methosulfate is very unlikely. Cross-reactivity of quaternium ammonium compounds is also not well understood. They are also frequently found in hair cleansing products; 30% of hair conditioners and 6% of hair shampoos in CAMP contain quaternium ammonium compounds related to benzalkonium chloride. Wen Sweet Almond Mint, Lavender, and Pomegranate hair cleansers, thus, are not uniquely sensitizing by inclusion of quaternium ammonium compounds, and reflect common industry practice.



Ingredients which are *extremely unlikely* to cause allergic contact dermatitis include several botanical agents (witch hazel, cucumber, wheat, soy, guar, aloe, avocado) as well as panthenol, PEG-60 almond glycerides, citric acid, amodimethicone, glycerin and water. Panthenol, citric acid, amodimethicone glycerin, guar, and aloe str extremely rare sensitizers and common ingredients in hair cleansing products. Panthenol is found in 39% of hair conditioners and 31% of hair shampoos in CAMP. Citric acid is found in 47% of hair conditioners and 78% of hair shampoos in CAMP. Amodimethicone is found in 29% of hair conditioners and 13% of hair shampoos in CAMP. Glycerin is found in 46% of hair conditioners and 31% of hair shampoos in CAMP. Guar is found in 5% of hair conditioners and 42% of hair shampoos in CAMP. Aloe is found in 14% of hair conditioners and 10% of hair shampoos in CAMP. PEG-60 almond glycerides as well as witch hazel, cucumber, wheat, soy, and avocado are all rare potential sensitizers and rare (< 2%) ingredients in hair cleansing products in CAMP.

In conclusion, there is nothing unique about the ingredients in Wen Sweet Almond Mint, Lavender, and Pomegranate hair cleansers which raises specific concern about allergic contact dermatitis to these three products as compared to other hair cleansing products on the market.

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