

## HAZARDOUS SUBSTANCES IN COSMETICS

### Benzalkonium Chloride

Benzalkonium Chloride is used as a disinfectant to prevent the growth of micro organisms in products. It is most commonly found in eye drops, contact lens solution, facial and acne cleansers, mouthwash, and nasal sprays, but can also be found in moisturizers and sunscreens. Benzalkonium chloride can cause severe allergic reactions in people who are sensitive and can be especially problematic to people suffering from asthma. Concentrations of greater than 10% are extremely toxic to the skin and mucus layers of the body. Although most products contain 0.01% or less, repeated use of nasal sprays and eye drops containing benzalkonium chloride can cause irritation to the nasal passageway or eyes, while concentrations of 0.02% or higher in contact lens solution may cause damage to the eyes if used repeatedly over time.



1. Skin Deep: Benzalkonium Chloride
2. Study on Benzalkonium Chloride and Asthma:  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2687669/>
3. [http://cosmeticsinfo.org/ingredient\\_details.php?ingredient\\_id=259](http://cosmeticsinfo.org/ingredient_details.php?ingredient_id=259)
4. <http://www.nlm.nih.gov/medlineplus/ency/article/000005.htm>

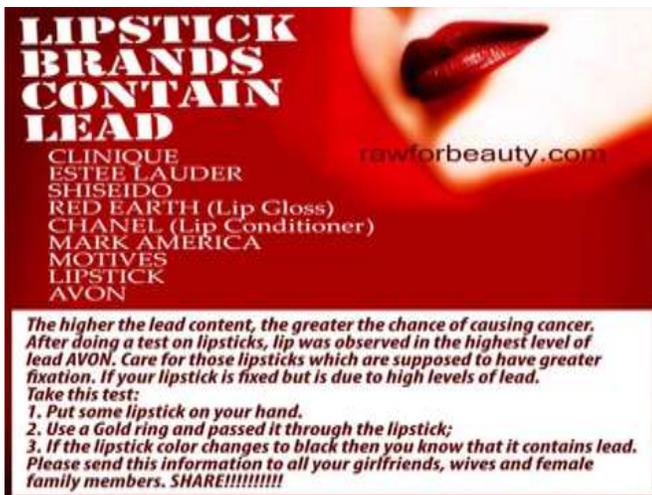
### Benzophenone

Benzophenone can be found in nail polish, shampoos, body washes, hair styling gels, perfumes, lip products and sunscreens. The main concern is its use in sunscreens as benzophenone may potentially be carcinogenic. Benzophenone is also suspected of being an endocrine disruptor and toxic to the skin and sensory organs. The European Union has identified it as "substance of very high concern" and prioritized for replacement for safer alternatives. In Canada, it is classified as "expected to be toxic or harmful" to humans as well as being toxic to the environment.



1. Good Guide: [http://www.goodguide.com/ingredients/115576-benzophenone?category\\_id=152758-shampoo](http://www.goodguide.com/ingredients/115576-benzophenone?category_id=152758-shampoo)
2. Our Stolen Future: <http://www.ourstolenfuture.org/basics/chemuses.htm>
3. SkinDeep: Benzophenone

BHA and BHT are similar synthetic antioxidants used as preservatives in many lip and eye products (lipstick, eyeliner, mascara, etc.), as well as moisturizers and lotions. BHA has been classified as a possible human carcinogen and a hormone disruptor, while BHT can cause allergic reactions and is a possible reproductive toxicant. One type of BHA, Salicylic Acid, used in many acne products, can also cause photosensitivity, which can accelerate and exacerbate sun damage. Health Canada has classified BHA as a “high human health priority,” and BHT as “moderate human health priority,” and both chemicals have been flagged for future assessment. The European Union, meanwhile, prohibits the use of BHA in fragrance and the State of California requires warning labels notifying that BHA is an ingredient that may cause cancer.



1. Skin Deep: BHA and BHT
2. David Suzuki “Dirty Dozen”
3. <http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=7219D533-1>
4. <http://www.fda.gov/Cosmetics/ProductandIngredientSafety/SelectedCosmeticIngredients/ucm107943.htm>
5. <http://www.skincancer.org/prevention/are-you-at-risk/photosensitivity-a-reason-to-beeven-safer-in-the-sun>

## Coal Tar Dyes

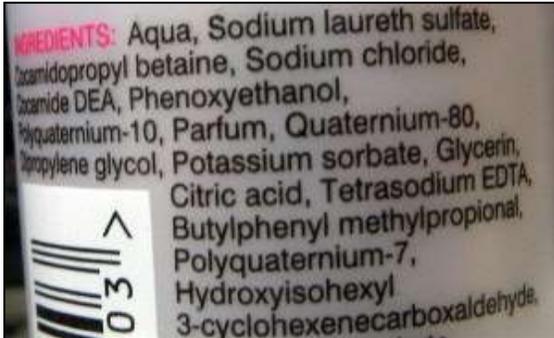
Coal tar dyes are dyes that were originally derived from coal tar; however today are mostly synthetically produced. They are usually listed by their name (e.g. Acid Red, Disperse Violet, and Basic Blue etc.) and are used extensively in cosmetics, especially in hair dyes, eye makeup and lipsticks. They can be identified by a five-digit Colour Index (C.I.) number or their U.S. colour name, listed under FD&C or D&C, followed by a colour name and number. Most coal tar dyes are safe for use in cosmetics; however there are some that have been found to be unsafe, such as Pphenylenediamine(PPD), as it is a sensitizer (it can cause allergic reactions) and it is also possibly carcinogenic. As such, PPD is not allowed in eye make-up but Canada still permits its use in hair dyes as long as it is accompanied with a warning label. Some studies have found that women, who use hair dyes, especially over extended periods of time, have an increased risk of developing certain types of cancer, although the evidence is conflicting.



1. Skin Deep: Coal Tar Dyes
2. David Suzuki “Dirty Dozen”
3. <http://www.hc-sc.gc.ca/cps-spc/cosmet-person/cons/safety-innocuite-eng.php#a42>

## DEA-related ingredients

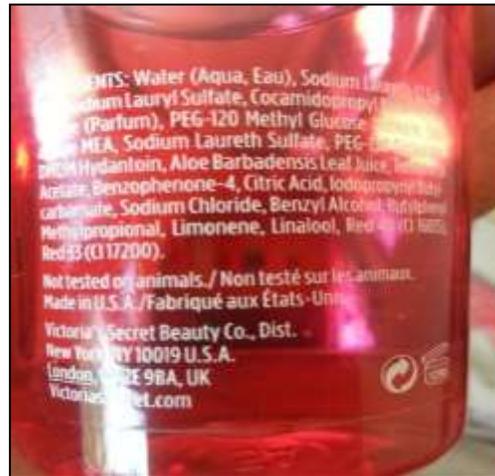
DEA-related ingredients are foaming agents used to make cosmetics like soaps, cleansers, and shampoos creamy or sudsy. They usually contain DEA, TEA or MEA in their name (e.g. Cocamide DEA, Lauramide DEA, Linoleamide MEA, and TEA-Lauryl Sulfate). DEA (Diethanolamine) was found to cause cancer in animals due to its ability to form nitrosamines, which are possible human carcinogens. The European Union has, therefore, classified DEA as harmful to health and restricts DEA-related ingredients. In Canada, DEA and nitrosamines are prohibited in cosmetics. However, DEA-related ingredients have no restrictions even though nitrosamines can be present as contaminants.



1. Skin Deep: DEA
2. David Suzuki "Dirty Dozen"
3. <http://www.cabdirect.org/abstracts/19701405410.html?freeview=true;>
4. <http://www.pnas.org/content/80/21/6694.short>
5. <http://www.fda.gov/Cosmetics/ProductandIngredientSafety/SelectedCosmeticIngredients/ucm109655.htm>

## Formaldehyde-releasing preservatives

Formaldehyde is a known human carcinogen and can be released from certain cosmetic ingredients, namely, DMDM hydantoin, diazolidinyl urea, imidazolidinyl urea, methenamine, quaternium-15, and sodium hydroxymethylglycinate. They are used as preservatives and are most commonly found in body wash, shampoo, conditioner, styling gel, moisturizer, and nail polish. Some formaldehyde-releasing preservatives are also allergens and can cause irritation to the skin and eyes; however its carcinogenic properties are the most concerning. Several studies show that professionals exposed to formaldehyde in their work place have an increased risk of leukemia and brain cancer compared with the general population. Thus, Health Canada recommends reducing or eliminating as many sources of formaldehyde as possible. Although Canada restricts the amount of formaldehyde in cosmetics, there are NO restrictions on the levels of formaldehyde-releasing preservatives. In contrast, the European Union ensures the reduction of formaldehyde by restricting the amount of both formaldehyde and formaldehyde-releasing preservatives.



1. Skin Deep: Formaldehyde, DMDM hydantoin
2. David Suzuki “Dirty Dozen”
3. <http://dermnetnz.org/dermatitis/formaldehyde-allergy.html>
4. <http://www.cancer.gov/cancertopics/factsheet/Risk/formaldehyde>

## Heavy Metal

Heavy metals, like arsenic, nickel, lead, mercury and cadmium, are found in cosmetics as contaminants. They can be present in mascara, lipstick, eye shadow, foundation and blush. Lead is a neurotoxicant, which can damage the nervous system and is also considered a carcinogen. It is usually present as an impurity of aluminium starch octenyl succinate and hydrogenated cottonseed oil, which are found in lotions and lipsticks. Canada has banned lead as an intentional ingredient in cosmetics but Environmental Defence Canada found that 96% of cosmetic products tested for heavy metals were contaminated with lead. Another heavy metal - cadmium - is classified as a human carcinogen and linked to breast cancer. Cadmium can be found in mascaras, but, just as with lead, it is present as an impurity. In Canada, contaminants are not required to be listed and, as such, it is difficult to know which products contain heavy metals. Since heavy metals can build up in the body over time, the best strategy to protect your health is to limit the use of cosmetic products.



1. Skin Deep: Lead
2. Environmental Defence: health risk of hidden heavy metals in face makeup

3. <http://www.ncbi.nlm.nih.gov/pubmed/9086478>
4. <http://www.sciencedaily.com/releases/2012/04/120423184203.htm>
5. <http://jocpr.com/vol2-iss6-2010/JCPR-2010-2-6-92-97.pdf>

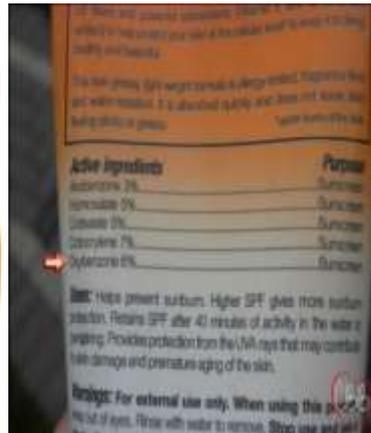
## Nonoxynols

Nonoxynols can be found in variety products but mainly found in hair care products (hair colour, styling sprays, gels and mousse, leave-in conditioners and hair relaxers). It is used as a detergent, wetting agent or defoaming agent. It can be found on ingredients list followed by a number (e.g. nonoxynol 10). Several nonoxynols are suspected endocrine disruptors according to Our Stolen Future and the Good Guide. They are also persistent and bioaccumulative in nature and may be contaminated with ethylene oxide and 1, 4 dioxane, both carcinogens.

1. GoodGuide: [http://www.goodguide.com/ingredients/164031-nonoxynol10?category\\_id=152675-conditioner](http://www.goodguide.com/ingredients/164031-nonoxynol10?category_id=152675-conditioner)
2. Skin Deep

## Oxybenzone

Oxybenzone provides protection from harmful UV rays so it is mainly found in sunscreen or products labeled with SPF protection such as lip balm and moisturizers. It is possibly linked to allergies, hormone disruption, developmental problems, and cell damage. In addition, it is also classified as a photo carcinogen, which means that it has the potential to produce free radicals that can damage DNA following exposure to sunlight. As such, it is restricted for use in Japan, while in the EU, products containing more than 0.5% oxybenzone must be labeled as "Contains Oxybenzone".



1. Skin Deep: Oxybenzone
2. <http://www.ewg.org/analysis/toxicsunscreen>
3. Good Guide
4. <http://www.ncbi.nlm.nih.gov/pubmed/18717962>
5. <http://www.ewg.org/report/what-scientists-say-about-vitamin-sunscreen>

## Perfume (Fragrance)

The term fragrance, which can also be listed as parfum or aroma, represents a complex mixture of many, undisclosed chemicals. It is found in almost every cosmetic product, as well as other consumer products like laundry detergent or dishwasher liquid. Unscented products may also contain fragrances, which are added to conceal the smell of other chemicals. Fragrance mixtures are considered industry trade secret, which means that companies are not required to disclose the list of chemicals found in fragrances. Many unlisted ingredients are classified as irritants, and there is evidence that exposure to fragrances can contribute to the development and/or the severity of asthma. The best way to avoid these toxicants in cosmetics is to stay away from products that list parfum or fragrance as an ingredient. Synthetic musk, used in fragrances, is especially damaging from an ecological perspective and most fragrances contain phthalates, which are hormone disruptors (see section on phthalates). In Contrast, the European Union has stronger regulations requiring warning labels on fragrance products containing common allergens and prohibiting the use of many ingredients, such as musk.



1. Skin Deep: parfum
2. David Suzuki “Dirty Dozen”
3. <http://safecosmetics.org/article.php?id=222>
4. <http://phthalates.americanchemistry.com/Research/EPAs-Endocrine-Disruptor-Screening-Program>

## Petrolatum

Petrolatum, also known as petroleum jelly, mineral jelly, mineral oil, or mineral grease, is found in moisturizers because it helps to lock moisture in the skin. However, petrolatum can be contaminated with polycyclic aromatic hydrocarbons (PAHs), which are known carcinogens. The European Union allows the use of petrolatum in cosmetics ONLY if there is full refining history and that it does not contain any carcinogens. In Canada petrolatum has been classified as a "high human health priority" and "expected to be toxic or harmful", but there are no restrictions in use.

1. Skin Deep: Petrolatum
2. David Suzuki “Dirty Dozen”
3. <http://www.atsdr.cdc.gov/csem/csem.asp?csem=13&po=11>
4. <http://www.mass.gov/dep/toxics/pahs.htm>



## Phthalates

Phthalates serve many functions in cosmetic products. Dibutyl phthalate (DBP) is mainly used in nail products to act as a plasticizer that prevents nail polish from becoming brittle, while diethylphthalates (DEP) are added to fragrances to make them last longer. They are usually not required to be listed on the products, especially if they are part of fragrance. Phthalates are considered hormone disruptors and several animal studies have shown that they can interfere with the development of the fetus and young children, and may impair fertility. Health Canada recognizes the potential danger of phthalates and has banned five types of phthalates from children's toys and child care products, yet its use in cosmetics is not restricted. In contrast, the EU has banned DBP from both cosmetics and childcare products and plans to phase out other phthalates by 2013.



1. <http://safecosmetics.org/article.php?id=290>
2. David Suzuki "Dirty Dozen"
3. <http://toxsci.oxfordjournals.org/content/72/2/301.short>
4. <http://safecosmetics.org/article.php?id=1062>
5. <http://phthalates.americanchemistry.com/Research/EPAs-Endocrine-Disruptor-Screening-Program>

## Polyethylene glycol and other PEG compounds

PEG compounds such as polyethylene glycol (PEG-7), are petroleum-based substances used to retain moisture in products such as skin creams, fragrance, and sunscreens. They are also used as thickeners or softeners in creams and cream based products. In Canada, it is classified as "expected to be toxic and harmful" due to studies showing its harmful effects on the skin and sensory organs. In addition, polyethylene glycol can undergo chemical reactions in the environment and form 1,4 dioxane and ethylene oxides, both of which are known human carcinogens. Health Canada bans 1,4 dioxane in cosmetics but they may be present as contaminants in products containing polyethylene glycol.

1. EWG Skin Deep: Polyethylene glycol
2. <http://www.davidsuzuki.org/issues/health/science/toxics/chemicals-in-your-cosmetics---peg-compounds-and-their-contaminants/>
3. [http://www.ec.gc.ca/substances/ese/eng/challenge/batch7/batch7\\_123-91-1.cfm](http://www.ec.gc.ca/substances/ese/eng/challenge/batch7/batch7_123-91-1.cfm)
4. <http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=240>

## Retinyl Palmitate

Retinyl palmitate can be found in sunscreen, moisturizers, and creams. It is a form of vitamin A, which is an essential nutrient and therefore safe to consume. However its use in cosmetics is controversial, particularly its use in sunscreens. Other forms of topical vitamin A, such as retinoic acid, are known to cause sensitivity to the sun and have been linked to an increase risk of skin cancer. Animal studies suggest that retinyl palmitate may behave similarly to other vitamin A compounds, and that it is a potential photo carcinogen.

1. Skin Deep: Retinylpalmitate
2. EWG: <http://www.ewg.org/report/what-scientists-say-about-vitamin-sunscreen>
3. <http://www.ncbi.nlm.nih.gov/pubmed/16823091>

## Selenium sulfide

Selenium sulfide is a highly toxic compound. It is the active ingredient in anti-dandruff products and scalp treatments, used for its anti-fungal properties. There is sufficient evidence to believe that it is a carcinogen. It is also believed to be toxic to the nervous system, the respiratory system, the liver, kidney and circulatory system. It has been banned in Japan and restricted in the EU due to its harmful effects. In addition, selenium sulfide is hard to break down in the environment and the human body, thus it can readily build up and accumulate. It has been classified as a "high human health priority" and "expected to be toxic or harmful" by Environment Canada.



1. EWG: Selenium sulfide
2. <http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/SeleniumSulfide.pdf>
3. <http://www.goodguide.com/ingredients/255328-selenium-sulfide>
4. <http://www.sciencedirect.com/science/article/pii/S0041008X71900925>

## Sodium laureth sulfate (SLES)

SLES is a foaming agent and added to products such as soaps, shampoos, toothpastes, and detergents. Industry insiders point out that the sole purpose of foaming agents is that they act as psychological "evidence" that the product is working effectively. The issue with SLES is that it can be contaminated with 1,4 dioxane, a possible carcinogen. In addition, it can be readily absorbed into the body through the skin and/or scalp. SLES is categorized as a "moderate human health priority" under Health Canada's Chemical Management Plan. SLES should not be confused with SLS, which has been mistakenly labelled as a carcinogen. The only issue with SLS is that it is a mild irritant to the eyes and skin).

1. EWG
2. <http://www.davidsuzuki.org/issues/health/science/toxics/chemicals-in-your-cosmetics---sodium-laureth-sulfate/>
3. [http://healthychild.org/issues/chemical-pop/sodium\\_laureth\\_sulfate/](http://healthychild.org/issues/chemical-pop/sodium_laureth_sulfate/)
4. Duhigg, Charles. The Power Of Habit (2012). p. 59
5. <http://www.epa.gov/hpv/pubs/summaries/sodium22/c16316tp.pdf>

## Toluene

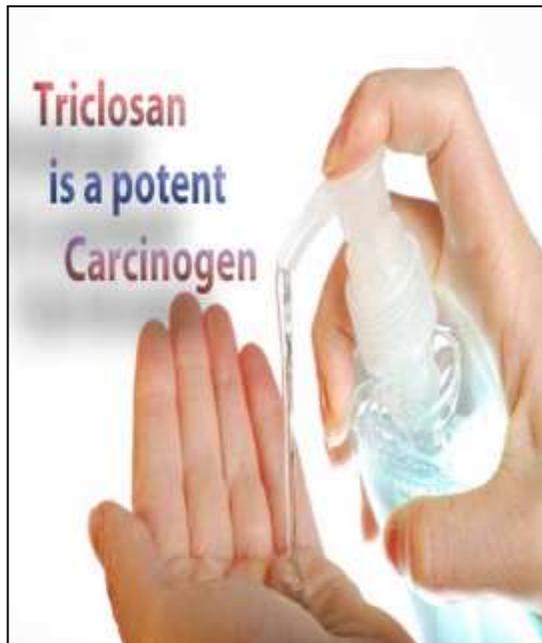
Toluene helps nail polish apply smoothly and adhere evenly; thus, it is mainly found in nail polish. The International Fragrance Association has deemed it unsafe and banned its use in fragrances. However, Canada still permits the use of toluene in nail polish while it is prohibited in the European Union. There is strong evidence that toluene is a human developmental toxicant that can lead to birth defects, particularly neurological effects in developing fetuses. It may also affect fertility. Inhaling toluene can also affect the

brain by causing tiredness, dizziness and nausea. The EPA classifies toluene as a known human respiratory toxicant and irritant to the skin, eyes, and lungs. Another health concern is that toluene may be contaminated with benzene, which is a known carcinogen.

1. Skin Deep: Toluene
2. <http://cosmeticsinfo.org/HBI/27/>
3. <http://www.atsdr.cdc.gov/phs/phs.asp?id=159&tid=29>

## Triclosan

Triclosan can be found in various consumer products ranging from soaps, toothpastes, and acne creams to cleaning products, furniture and clothing. It is used for its antibacterial and antifungal properties and is the active ingredient in most antibacterial products. Yet, in most cases, there is no evidence that triclosan provides any health benefits over using regular, no antibacterial products. Triclosan has been linked to a variety of problems, namely allergies, endocrine disruption and, most importantly microbial resistance. In 2009, the Canadian Medical Association asked Health Canada to ban the use of triclosan and other anti-microbial agents in household products due to concerns about bacterial resistance. Triclosan does not break down easily in the environment and can accumulate in the tissues of living organisms. In addition, once washed down the drain, it enters our waterways, where it can react with light and chlorine to form dioxins and chloroform, both known carcinogens. Health Canada recently reviewed triclosan and found it to be toxic to aquatic systems.



1. EWG Skindeep Database: Triclosan <http://www.ewg.org/skindeep/ingredient/706623/TRICLOSAN/>
  2. [http://www.hc-sc.gc.ca/ahc-asc/media/nr-cp/\\_2012/2012-48-eng.php](http://www.hc-sc.gc.ca/ahc-asc/media/nr-cp/_2012/2012-48-eng.php)
  3. <http://ec.europa.eu/health/opinions/triclosan/en/index.htm>
  4. <http://www.scientificamerican.com/article.cfm?id=strange-but-true-antibacterialproducts-may-do-more-harm-than-good>
  5. <http://www.fda.gov/forconsumers/consumerupdates/ucm205999.htm>
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