Formaldehyde And Formaldehyde-Releasing Preservatives

Formaldehyde and formaldehyde-releasing preservatives (FRPs) are used in many personal care products,[1] particularly in shampoos and liquid baby soaps.

These chemicals, which help prevent microbes from growing in water-based products, can be absorbed through the skin and have been linked to cancer and allergic skin reactions.

WHAT ARE FORMALDEHYDE-RELEASING PRESERVATIVES AND WHERE ARE THEY FOUND?

Formaldehyde is a colorless, strong-smelling gas used in a wide range of industries and products including building materials, walls, cabinets furniture and personal care products.[2]

In personal care products, formaldehyde can be added directly, or more often, it can be released from preservatives[3][4] such as quaternium-15, DMDM hydantoin, imidazolidinyl urea, diazolidinyl urea, polyoxymethylene urea, sodium hydroxymethylglycinate, bromopol and glyoxal.

These preservatives release small amounts of formaldehyde over time. Since low levels of formaldehyde can cause health concerns-at levels as low as 250 parts per million[5] and even lower levels in sensitized individuals[6]-the slow release of small amounts of formaldehyde are cause for concern. A 2015 study determined that longer storage time and higher temperature increase the amount of formaldehyde released from FRPs and could ultimately lead to more severe health concerns.[7]

Quaternium-15 is the most sensitizing of these FRPs and is found in blush, mascara, lotion and shampoo.[8]

DMDM Hydantoin is found in lotion, sunscreen and make-up remover and is one of the least sensitizing of the FRPs.[9]

Imidazolidinyl urea, diazolidinyl urea, and polyoxymethylene urea, are found in shampoo, conditioner, blush, eye shadow, and lotion and are all known human allergens.[10] Imidazolidinyl urea is one of the most common antimicrobial agents used in personal care products and is often combined with parabens to provide a broad spectrum preservative system.[11] Diazolidinyl urea releases the most formaldehyde of any FRP.[12][13][14]

Sodium hydroxymethylglycinate is found in shampoo, moisturizer, conditioner, and lotion. Animal studies have shown that sodium hydroxymethylglycinate has the potential for sensitization and dermatitis.[15]

Bromopol is found in nail polish, makeup remover, moisturizer and body wash. Bromopol is considered safe in concentrations less than 0.1%, but cannot be found in formulations with the FRP amine. Mixing bromopol and amines produce nitrosamines

(Link to same chemical in nitrosamines) which have been found to penetrate the skin and cause cancer.[16]

Glyoxal is found in conditioner, lotion, nail polish and nail treatment. CIR Expert Panel has declared that glyoxal is a skin allergen.[17]

Found In

- Nail polish
- Nail glue
- Eyelash glue
- Hair gel
- Hair-smoothing products
- Baby shampoo
- Body soap
- Body wash
- Color cosmetics

What to look for on the label

- Formaldehyde
- Quaternium-15
- DMDM hydantoin
- Imidazolidinyl urea
- Diazolidinyl urea
- Polyoxymethylene urea
- Sodium hydroxymethylglycinate
- 2-bromo-2-nitropropane-1,3-diol (bromopol)
- Glyoxal

Health Concerns

Cancer: Formaldehyde is considered a known human carcinogen by many expert and government bodies, including the United States National Toxicology Program[9] and the International Agency for Research on Cancer.[18] A 2009 review of the literature on occupational exposures and formaldehyde shows a link between formaldehyde and leukemia.[19] A 2014 study found that formaldehyde initiates and promotes tumor formation.[20] When formaldehyde is present in personal care products, people can be exposed by inhaling the formaldehyde that is off-gassed from the product, by ingesting it or by absorbing it through the skin. Most studies of the cancer potency of

formaldehyde have focused on risks from inhaling it; cancer risks from ingesting formaldehyde or absorbing it through the skin are not as well studied.[21] Animal studies indicate that formaldehyde can be absorbed through the skin when formaldehyde-containing personal care products, including formaldehyde-releasing preservatives, are applied.[22]

The formaldehyde released from FRPs has been linked to cancer, but there is little evidence that FRPs directly cause cancer. However, a mixture of the FRP bromopol and amines, which form nitrosamines, has been found to penetrate skin and cause cancer.[23]

Irritation: Formaldehyde is the 2015 American Contact Dermatitis Society Contact Allergen of the Year.[24] At high concentrations formaldehyde can cause chemical burns, however, this is mostly an occupational hazard.[25] Formaldehyde in cosmetics is widely understood to cause allergic skin reactions and rashes in some people.[26][27][28] Although concentrations of formaldehyde in personal care products are generally low, everyday products can contain enough formaldehyde to trigger a reaction in people with formaldehyde sensitivities.[29] A 2015 study determined that up to 11.9% of the population is allergic to formaldehyde when exposed to a 2.0% formaldehyde patch test.[30] Formaldehyde sensitivity may develop over time from repeated low-level exposures.[31]

Most irritation from FRPs is in response to formaldehyde being released; however some of the FRPs can trigger a reaction on their own. Quanternium-15 is the most sensitizing of the FRPs.[32] A retrospective study by the North American Contact Dermatitis Group (NACDG) revealed an increase in the incidence of allergic reactions to Quaternium-15 over time. Patch tests of Quaternium-15 revealed that about 22.3% of consumers are allergic to Quaternium-15.[33] Glyoxal and sodium hydroxymethylglycinate are known skin allergen.[34][35] Animal studies have shown that sodium hydroxymethylglycinate may cause sensitization and dermatitis. Irritation has gone away when products containing sodium hydroxymethylglycinate are avoided.[36]

Vulnerable Populations

Babies & Children (https://www.safecosmetics.org/population/babies-children/), Teenagers (https://www.safecosmetics.org/population/teenagers/), Women of Color (https://www.safecosmetics.org/population/women-of-color/), Workers (https://www.safecosmetics.org/population/workers/)

Regulations

Banned from use in cosmetics and toiletries in Japan and Sweden;[37] in the EU, restricted in personal care products, and labeling is required in products that do contain these chemicals;[38] concentration restrictions in Canada.[39] The EU allows the use of Quaternium-15 up to 0.2% as a preservative in cosmetic products.[40]

How to Avoid?

Read labels and avoid products containing the following ingredients: Formaldehyde, quaternium-15, dimethyl-dimethyl (DMDM) hydantoin, imidazolidinyl urea, diazolidinyl urea, sodium hydroxymethylglycinate, 2-bromo-2-nitropropane-1,3-diol (bromopol). In addition, choose nail products that are labeled formaldehyde-free or "toxic-trio-free" (formaldehyde, toluene and DBP). Skip hair-smoothing products—especially those sold in salons, as salon-based products are exempt from labeling laws. Don't use expired cosmetic products or store cosmetic products in the sun because this can cause more formaldehyde to be released.[41]

Explore other Chemicals

Talc (https://www.safecosmetics.org/chemicals/talc/)

Phenoxyethanol (https://www.safecosmetics.org/chemicals/phenoxyethanol/)

Toluene (https://www.safecosmetics.org/chemicals/toluene/)

Nanomaterials (https://www.safecosmetics.org/chemicals/nanomaterials/)

Mica (https://www.safecosmetics.org/chemicals/mica/)

Fragrance (https://www.safecosmetics.org/chemicals/fragrance/)

View All Chemicals of Concern > (/chemicals/)

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