

Controversial ingredients:
Parabens, Formaldehyde
liberators, dioxane.

Parabens

- Parabens are widely used preservatives and it is used in various pharmaceuticals products.
- They are a series of P- hydroxybenzoates or esters of P- hydroxybenzoic acid.
- It is used in many cosmetic formulations such as shampoos, shaving gels , commercial moisturizers, topical/ parenteral preparations, tanning solution, toothpaste and also in a food additives.
- Its antibacterial mode of action is not well understood but it is more effective against broad spectrum of microorganisms by inhibiting the synthesis of DNA and RNA.

The Health Controversies of Parabens

- the ubiquitous presence of parabens, with levels detected in wastewater, rivers, soil and house dust.
- Parabens have also been detected in human tissues and bodily fluids, but it is the discovery of these chemical compounds in the breast tissue of patients with breast cancer that has raised public concern over their use
- the estrogenic properties of parabens may play a role in breast cancer development.

Parabens

- Common parabens include are: methyl paraben, propyl paraben, ethyl paraben and butyl paraben.
- Parabens are controversial due to following factors given by American cancer society and FDA:
- According to research, it is found that it is relatively safe, posing only a negligible risk to the endocrine systems. • Allergic reactions • Breast cancer • Estrogenic activity • Sun exposure

The Health Controversies of Parabens

- Parabens can mimic hormones in the body and disrupt functions of the endocrine system.
- Paraben can enter in your body through your skin when you applied it on the skin.
- According to Mercola , the body can absorb as much as 5 pounds of cosmetic chemicals every year.
- Health concerns: Breast cancer
- Cornell university reports that a high lifelong exposure to estrogen can increase risk of it. • Paraben accumulate in fat cells including breast tissues and leads to cause breast cancer. • Eg.: methyl paraben 5

The Health Controversies of Parabens

- Ideally, preservatives should be active at low concentrations against a wide variety of microorganisms without interfering with other ingredients in the product, while also remaining nontoxic to humans and available at low cost to manufacturers.
- Parabens have been used for over 80 years and, despite reports of adverse reactions, they have proven to be amongst the safest and most well tolerated preservatives.
- Although the possible association of parabens with decreased sperm quality and breast cancer does warrant continued examination, the current data does not support drastic regulations or personal restrictions to exposure.

Formaldehyde and Formaldehyde-releasing preservatives (FRPs)

Formaldehyde and formaldehyde-releasing preservatives (FRPs)

- Formaldehyde and formaldehyde-releasing preservatives (FRPs) are used in many personal care products, 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.
- In personal care products, formaldehyde can be added directly, or it can be released from preservatives such as quaternium-15, DMDM hydantoin, imidazolidinyl urea, diazolidinyl urea, polyoxymethylene urea, sodium hydroxymethylglycinate, bromopol and glyoxal.

FORMALDEHYDE LIBERATORS

Also known by the name :-

- Formalin
- Formic aldehyde
- Methanediol
- Methanal
- Methyl aldehyde
- Methylene glycol
- Methylene oxide

FORMALDEHYDE LIBERATORS

They are commonly found in products such as

- Shampoos
- Conditioners
- Skin moisturizers
- Cleanser
- Hand cream
- Hair gel
- Shaving cream
- nail polishes
- nail hardeners
- eyelash glues

FORMALDEHYDE LIBERATORS

- ❑ Formaldehyde (also known as **methanal**) at room temperature is a colorless, flammable gas which process a pungent smell and is soluble in water and acetone.
- ❑ Formaldehyde is categorized by the Environmental Protection Agency as a human carcinogen.
- ❑ when dissolved in water it is called *formalin*, which is commonly used as an industrial disinfectant, preservatives in cosmetics and also as a preservative in funeral homes and medical labs.

FORMALDEHYDE LIBERATORS

Formula: CH₂O

IUPAC ID: Methanal

Properties of formaldehyde

Odour: suffocating and pungent small

Appearance: colourless

Form: gaseous state

Solubility: soluble in water and acetone

Solubility in water: 400g/l

Molar mass: 30.031 g/mol

Boiling point: -19 °C

FORMALDEHYDE LIBERATORS

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

Formaldehyde and formaldehyde releasing preservatives are found in many personal care products, particularly in **shampoos, liquid baby soaps, nail polish, nail glue, hair gel etc.**

FORMALDEHYDE LIBERATORS

- 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.
- 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.

FORMALDEHYDE LIBERATORS

- ❑ **Quaternium-15** is the most sensitizing of these FRPs and is found in blush, mascara, lotion and shampoo.
- ❑ **DMDM Hydantoin** is found in lotion, sunscreen and make-up remover and is one of the least sensitizing of the FRPs
- ❑ **Imidazolidinyl urea, diazolidinyl urea, and polyoxymethylene urea**, are found in shampoo, conditioner, blush, eye shadow, and lotion and are all known human allergens.

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. Diazolidinyl urea releases the most formaldehyde of any FRP.

FORMALDEHYDE LIBERATORS

- ❑ **Sodium hydroxymethylglycinate** is found in shampoo, moisturizer, conditioner, and lotion. Animal studies have shown that sodium hydroxymethylglycinate has the potential for sensitization and dermatitis.
- ❑ **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.
- ❑ **Glyoxal** is found in conditioner, lotion, nail polish and nail treatment. CIR Expert Panel has declared that glyoxal is a skin allergen

FORMALDEHYDE LIBERATORS

- The main way of contaminating or exposure to formaldehyde is by **inhaling** it.
- Formaldehyde in the liquid form can also be absorbed through the skin.
- People get contaminated to small amounts of formaldehyde by eating foods or drinking liquids containing formaldehyde.

FORMALDEHYDE LIBERATORS

CANCER

Formaldehyde is considered as a known human carcinogenic by many experts and government bodies.

A 2014 study found that formaldehyde initiates and promotes tumour formation. It enters into a body through an inhalation of formaldehyde containing formulations leads to cause cancer.

IRRITATION

Formaldehyde, in the 2015 by American contact dermatitis society considered as contact allergen of the year. It also results in occurrence of sensitivity.

REGULATIONS

Banned from use in cosmetics and toiletries in Japan and Sweden.

EU allows the use of quaternium 15 upto 0.2% as preservatives in cosmetics products.

FORMALDEHYDE LIBERATORS

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.**

FORMALDEHYDE LIBERATORS

Good Practices

- Don't use expired cosmetics products or store cosmetic products in the sun because this can cause more formaldehyde to be released.
- Choose nail products that are labeled formaldehyde free or toxic free (formaldehyde, toluene and DBP).

FORMALDEHYDE LIBERATORS

REGULATIONS

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

FORMALDEHYDE LIBERATORS

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).