

# Current Concerns about Cosmetic Products' Risks for Consumer Safety and Health

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## Abstract

*Using extensively cosmetic products by broad consumers categories, lacking proper education and information about this field, alongside the alarming findings of many scientific studies about associated possible dangers urge acknowledging and disseminating information. The paper presents the main negative effects and risks caused by cosmetic ingredients, but also ways to diminish or avoid them.*

**Key words:** *cosmetic products, health risks, consumer safety*

## Introduction

Today, cosmetics are so much a part of the daily regime that most consumers probably never think twice about them. If we find them on store shelves, it seems reasonable to figure that they are safe to use, despite several unpronounceable ingredient lists.

At present, a lot of scientific evidence shows that a large number of cosmetic products are made up of ingredients that could be harmful to consumer's health. Since the law regulators had not set secure standards for the safety testing of cosmetics, consumers find themselves in the position of being their own watchdog. More and more people are concerned about potentially dangerous chemicals some cosmetics companies use in their products.

Companies that have eliminated dangerous ingredients are no doubt getting the message that people are paying more attention to ingredients. But public concern isn't the only factor driving the chemical composition reformulations; another reason is the European ban.

A known fact is that the United States (US) uses in the cosmetic products many chemicals that the European Union (EU) has banned; so, the US is loosely monitoring chemical additives in cosmetics - nail polishes, skin cremes, deodorants - ingredients that consumers are putting on their bodies every day, with unknown or harmful consequences of both short and long term usage.

Although the U.S. has outlawed just eight cosmetic ingredients, the European Union has banned more than 1000 [23]. For companies that make cosmetics, complying with EU rules makes good business sense. Many US companies have publicly pledged their allegiance to cosmetic safety by signing the Compact for Global Production of Safe Health & Beauty Products, under which they voluntarily pledged to globally reformulate to meet EU standards.

## Dangers Caused by Cosmetic Products

Using make-up frequently, women are being exposed to deadly diseases through the everyday use of common cosmetics bought over the counter. The increasingly numerous synthetic ingredients manufacturers add to their products turn the usual products into cocktails of toxins that could cause cancer over years of sustained use [2]. These synthetic ingredients are inexpensive, stable and have a long shelf-life, to the benefit of the manufacturers.

The adverse effects of toxins are accumulating over decades, confusing hormone receptors and slowly altering cell structure. Chemicals are transmitted into the bloodstream in a number of ways: powders have the least absorption, while oily solutions or those designed to increase moisture allow more of the chemical to be absorbed.

Scientists admit that virtually all substances spread on the skin have a very real chance of being absorbed into the blood stream, causing some serious damage in the body health. Coal tar colors, phenylenediamine, benzene, even formaldehyde, are just a few of the synthetic chemicals commonly included in shampoos, skin creams and blushes - toxins which are absorbed into the skin with every use [2].

Eye makeup can be absorbed by the highly sensitive mucous membranes. Hair sprays, perfumes and dusting powders can be inhaled, irritating the lungs. Lipstick is often chewed off and swallowed.

The United Nations Environmental Program estimates that approximately 70000 chemicals are in common use across the world with 1000 new chemicals being introduced every year.

In the US, a six-month computer investigation evaluated the safety of over 10000 personal care product ingredients and included 2300 people. The investigation revealed the following *information* on personal care use [27]:

- Each day, the average adult uses nine personal care products that contain 126 different chemical ingredients;
- Over a quarter of a million women and one out of every 100 men use 15 products a day, on average;
- An astounding one-third of all the products assessed contained at least one ingredient that fell under the classification of human carcinogen;
- 71 percent of the hair dye products evaluated had carcinogenic coal tar as part of their ingredients;
- Almost 70 percent of the reviewed products were found to have ingredients that could be tainted with impurities related to cancer and other health complications;
- Over the course of keeping watch over the cosmetic industry, the FDA has banned a mere nine personal care products.

According to a recent report by the Environmental Working Group (EWG) as part of an effort by EWG to provide comprehensive safety information on industrial chemicals in cosmetics, every adult American uses an average of 10 personal care products a day containing 100 or more unique chemicals. The study [3] identified a total of 200 chemicals from personal care products alone, many of them being well known toxins.

## Cosmetic Ingredients Raising Serious Concerns

### Phthalates

Manufacturers use phthalates because they cling to the skin and nails to give perfumes, hair gels, and nail polishes more staying power.

In the US, The Environmental Working Group (EWG) released the first-ever consumer alert on beauty products that contain dibutyl phthalate (DBP), a chemical coming under growing scientific scrutiny because of high levels found in reproductive age women and possible risks of birth defects [21].

Scientific concerns about DBP's risks increased when in 2005, the federal Centers for Disease Control and Prevention (CDC) reported that they had found breakdown chemicals from two of the most common cosmetic phthalates in almost every member of a group of 2782 people they examined, with the highest levels in reproductive-age women, the group most at risk. According to lab animal studies, DBP can harm nearly every physical structure in the developing male reproductive system. The phthalates disrupt hormonal functions, which control normal cell development and reproduction [1].

A separate study published in the journal *Environmental Health Perspectives* (EHP) in 2005 showed that men who used the most personal-care products, such as after-shave and cologne, had the highest urinary levels of a breakdown product of diethyl phthalate (DEP). Also, a 2006 report cited low testosterone levels in male newborns exposed to higher levels of phthalates in breast milk.

DBP is used to help nail polish form an even film as it dries, as a consistency enhancer to keep products blended, and as an ingredient to help cosmetics penetrate the skin. It can be absorbed through the skin or inhaled as a product is applied.

The CDC has postulated that one of the routes of DBP exposure in young women would be cosmetics and personal care items.

To better identify consumer sources of DBP, EWG surfed an on-line store (Drugstore.com), searched the U.S. patent office records for products that contain DBP in the patent application and found the following [25]:

- DBP in 37 popular nail polishes, top coats, and hardeners, including products by L'Oréal, Maybelline, Oil of Olay, and CoverGirl;
- Patents proposing to use DBP in a broad range of beauty and personal care products, including shampoos and conditioners, lotions, hair growth formulations, antiperspirants, and sunscreen;
- Many major manufacturers (Procter & Gamble, Lever Brothers, Maybelline) suggesting the use of DBP in cosmetics and related products.

Yet, several big-name brands that have reformulated products to remove phthalates include Avon, Cover Girl, Estée Lauder, L'Oréal, Max Factor, Orly, and Revlon.

Nevertheless, phthalates can be found in too many other personal-care products, including body lotions, hair sprays, perfumes, deodorants and detergents, food packaging, pharmaceuticals, plastic toys. In many cases, they are not listed on labels, so they can be difficult to avoid.

A 2003 European Union directive bans phthalates in cosmetics sold in Europe, but US and Canadian regulators have not been so proactive, despite mounting evidence of potential harm [28].

## **Parabens**

Parabens are used as preservatives, and on the label they may be listed as methyl paraben, ethyl paraben, propyl paraben, butyl paraben, isobutyl paraben or E216.

Researchers have found traces of parabens in every sample of tissue taken from 20 different breast tumors [27]. Studies suggest that paraben, a chemical found in underarm deodorants and other cosmetics, can seep into the tissue after being applied to the skin and in this case, deodorants can be linked to an increased risk of breast cancer (unlike antiperspirants, deodorants work by neutralizing the smell of the sweat and by antiseptic action against bacteria, but do not prevent sweating).

This finding concerned researchers since parabens have been shown to be able to act just like the female hormone estrogen, which can drive the growth of human breast tumors.

Consumers should look for natural deodorants, which should be available in local health food stores, but they have to read the labels carefully, as not all “natural” deodorants are paraben-free.

## **Aluminium compound**

With aluminium as the active ingredient, antiperspirants work by clogging, closing, or blocking the pores so that they can't release sweat.

A review of the common sources of aluminium for humans found that antiperspirant use can significantly increase the amount of aluminium absorbed by the body. According to the review, after a single underarm application of antiperspirant, about 0.012 percent of the aluminium may be absorbed [27].

Other concerning sources of aluminium to humans are food, drinking water, contaminated air, and industrial and medicinal, such as vaccines, exposure [13].

The concern with antiperspirant is that the aluminium it contains is absorbed by the body and wreaks havoc in the brain, where it is likely to contribute to the growing numbers of people coming down with Alzheimer's disease and also breast cancer.

A study conducted in 2004 by a Chicago allergologist who claims to have found a connection between antiperspirants, underarm shaving and cancer shows that the toxins in aluminium salts (such as aluminium chlorohydrate) do not normally penetrate the skin enough to cause a problem - unless the skin is shaven; in that case, the substance enters the lymphatic system, which is connected to the breast. This study found that women who perform underarm shaving and used antiperspirants had a diagnosis of breast cancer much earlier than the non-users.

Besides, British researchers have found traces of chemicals called parabens in tissue taken from women with breast cancer, suggesting that underarm cosmetics might be a cause of breast cancer [12]. At the very least, if consumers cannot totally avoid these products, if they are using a deodorant, in order to avoid the aluminium in antiperspirant they must also be certain that the deodorant does not contain parabens.

## **Triclosan**

The active ingredient in most antibacterial products is triclosan, an antibacterial agent that kills bacteria and inhibits bacterial growth. Yet not only does triclosan kill bacteria, but it also has been shown to kill human cells [14]. Triclosan was introduced into consumer products in 1995, and its use has spread rapidly, as they were marketed as an effective and necessary way to lower the risk of infection.

Antibacterial ingredients have become prevalent in products as: soaps, laundry detergents, shampoos, toothpastes, body washes, dish soaps and many household cleaning products.

However, many scientists fear that the widespread use could lead to a strain of resistant bacteria, and cause the ingredients to lose effectiveness for the times when they really are needed.

In the study, published in the March 2, 2004 journal *Annals of Internal Medicine* [16], people who used antibacterial soaps and cleansers developed cough, runny nose, sore throat, fever, vomiting, diarrhea and other symptoms just as often as people who used products that did not contain antibacterial ingredients, because antibacterial soaps do not protect against viruses.

### **Sodium Lauryl Sulfate (SLS)**

Sodium Lauryl Sulfate is found in: bubble baths, toothpastes, shampoos and lotions - is a detergent ingredient, which has been found to enter the brain, heart and liver and impair the immune system, and has been linked to eye and skin damage and irritations, skin rashes and allergic reactions.

The biggest problems occur when it is mixed with other chemicals, like those typically used in toiletries, because it can form carcinogenic compounds. According to a 1978 FDA report, shampooing the hair with a product contaminated with this nitrosamine can lead to its absorption into the body at levels much higher than eating nitrate-contaminated foods. (Researchers actually estimate the nitrate absorption from one shampoo is equal to eating a pound of bacon.) Whether or not a particular bottle of shampoo is contaminated with these powerful carcinogenic compounds can only be determined through laboratory testing [4].

SLS presents Toxicity being used also in toothpaste and is associated with Premature Hair Loss.

To minimize the risks, consumers should check for sodium lauryl sulfate their shampoos, toothpaste, liquid soaps, body gels and other skin products. Scientists recommend avoidance of any further skin contact with products containing this ingredient. Sun block products may also contain it and they are dangerous especially if they contain aluminium – this being a potentially dangerous combination for brain cell deterioration.

Given this, children must under no circumstances use shampoos and toothpaste containing sodium lauryl sulfate. Children under 6 are especially vulnerable to improper eye development [4]. Consumers should replace products containing SLS with safer alternatives (formulas without SLS).

### **Propylene Glycol (PG)**

This chemical is used in industry as anti-freeze, airplane de-icer, and brake fluid, but also in thousands of cosmetic preparations as a delivery vehicle and solvent.

It is found in beauty creams, cleansers, makeup, suntan lotions, lipsticks and other cosmetics and toiletries - possess humectant properties used to stop products from drying out, but it has also been linked to liver abnormalities and kidney damage. It is also known as a skin and eye irritant.

Recent findings indicate that propylene glycol has severe adverse health effects and has been found to cause contact dermatitis, ototoxicity, kidney damage and liver abnormalities in various clinical human and animal studies [4].

Even though the science of skin biology has advanced substantially since propylene glycol was first introduced to cosmetics, yet PG is still the major ingredient in most skin creams.

Propylene glycol has shown measurable toxicity to human cells in culture, inhibits skin cell growth in human tests and cell respiration in animal tests. PG is reported to directly alter cell membranes, to cause contact allergies and dermatitis, to cause skin thickening, skin dehydration and chronic surface damage.

New findings suggest that using PG and other occlusive (filming) ingredients on the skin actually ages the skin prematurely. Estimates are that the skin ages with at least 13 years for every 10 years of these types of products usage.

Consumers should avoid it and instead opt for alternative products containing glycerin or sorbitol.

*Other* cosmetic ingredients harmful for health, to list just a few, are as follows:

- *Alpha-Hydroxy Acids* - found in: moisturizers, toners, cleansers, masks, age-spot removers - are known for accelerating the exfoliation of dead skin cells, but they can also increase the skin's sensitivity to the sun by as much as 50 percent, leaving the consumer exposed to accelerated skin aging and the possibility of skin cancer. AHAs are best used at a concentration that is less than 10 percent.
- *Formaldehyde* - found in nail polish, shampoos, soaps, skin creams - are potentially irritating preservatives that can be absorbed into the skin and cause allergic reactions, headaches, even asthma. The ingredient, if listed at all, is often referred to as formalin. Its use in cosmetics is banned in Japan and Sweden.
- *Talc* - found in makeup and body powders - has been linked to ovarian cancer and has been found to induce cancer in rodents. Women should avoid using talc-based powders, especially on genital areas.
- *Mineral Oil* - found in makeup removers, lipsticks, lotions – is a petroleum derivative that has been linked to everything from clogged pores to cancer. Its density does not allow skin to breathe. Most experts advise us to avoid it.
- *Methyl Methacrylate* - found in nail products, primarily used in application of acrylic nails - has been linked to fungal infections, nail deformities and other problems. Prolonged exposure can lead to eye, skin and lung irritation, abnormal liver or kidney function, nervous system damage or reproductive problems. Consumers should use instead ethyl methacrylate, a safer but expensive bonding liquid.
- To mention another example, *lead* in lipstick is an ongoing problem; as a neurotoxin, lead can cause severe health problems affecting learning, language and behavior. According to product tests released in October 2007 by the Campaign for Safe Cosmetics, popular brands of lipstick contain extremely high levels of lead [21].

## Helping Consumers to Know and Act

In the US, the Washington-based organization has made it easy to calculate the risk of exposure to potentially harmful substances through the personal care products used. The EWG's Skin Deep database offers comparisons of 25000 products, matching ingredients with the latest research from government and academic institutions.

The Skin Deep database allows typing in the brand name of a cosmetic product and finding the cosmetics risk rating. The site tells how many ingredients the products collectively contain, and the calculator will rate the aggregate health threat those ingredients may pose to the consumer.

Each product is ranked according to its ingredients' potential to:

- Cause cancer;

- Trigger allergic reactions;
- Interfere with the endocrine (hormonal) system;
- Impair reproduction or damage a developing fetus.

Any harmful impurities in the product are also considered. Containing unstudied ingredients or a "penetration enhancer" that helps chemicals get absorbed through the skin also enter into the equation, as does any violation of industry safety recommendations surrounding its use.

Also, at <http://www.health-report.co.uk/ingredients-directory.htm>, any consumer can read about risky ingredients in their personal care products, even in so-called "natural" ones. The user is given three search options getting onto the site:

- Search by the manufacturer;
- Search the website database by keying in the chemical ingredient;
- Search in the database for chemical toxicity data not found in other sections.

Another easy-to-use list of harmful cosmetic ingredients can be found at <http://www.alkalizerforhealth.net/Ltoxiccosmetics.htm>.

Almost all cosmetics can cause allergic reactions in certain individuals. Often the first sign of a reaction is a mild redness and irritation. There is no list of ingredients that can be guaranteed not to cause allergic reactions, so consumers who are prone to allergies should pay careful attention to what they use on their skin [5].

Some of the more common terms that consumers should be aware of include [5]:

- Natural: implies that ingredients are extracted directly from plants or animal products as opposed to being produced synthetically. There is no basis in fact or scientific legitimacy to the notion that products containing natural ingredients are good for the skin.
- Hypoallergenic: implies that products making this claim are less likely to cause allergic reactions. There are no prescribed scientific studies required to substantiate this claim. Likewise, the terms "dermatologist-tested," "sensitivity tested," "allergy tested," or "nonirritating" carry no guarantee that they won't cause skin reactions.
- Alcohol Free: traditionally meant that certain cosmetic products do not contain ethyl alcohol (or grain alcohol). Cosmetic products, however, may contain other alcohols, such as cetyl, stearyl, cetearyl, or lanolin, which are known as fatty alcohols.
- Fragrance Free: implies that a cosmetic product so labeled has no perceptible odor. Fragrance ingredients may be added to a fragrance-free cosmetic to mask any offensive odor originating from the raw materials used, but in a smaller amount than is needed to impart a noticeable scent.
- Noncomedogenic: suggests that products do not contain common pore-clogging ingredients that could lead to acne.
- Shelf Life (Expiration Date): the extent of time for which a cosmetic product is good under normal conditions of storage and use, depending on the product's composition, packaging, preservation, etc. Expiration dates are, for practical purposes, a rule of thumb, and a product may expire long before that date if it has not been stored and handled properly.
- Cruelty Free: implies that products have not been tested on animals. Most ingredients used in cosmetics have at some point been tested on animals so consumers may want to look for "no new animal testing" to get a more accurate indication.

The list of ingredients can help consumers determine if there is any significant difference between products labeled similar to the above and competing brands that do not make these claims.

Since the cosmetics industry often produces new, reworked versions of old ingredients, a wise consumer will take the time to read the labels to know what is in a product and how to use it safely. After all, consumers are likely to try other products with the same recognizable names. Once the consumer has all the information, he/she can begin to make his/her own decisions about what products work best.

Serious injury from makeup is a rare occurrence, but it does happen. Good common sense and a few precautions can help consumers protect themselves against hazards associated with the misuse of cosmetics [5]:

- Never drive and apply makeup. Not only does it make for dangerous driving, but hitting a bump in the road and scratching the eyeball can cause bacteria to contaminate the cut and could result in serious injury, including blindness.
- Never share makeup. Always use a new disposable applicator when sampling products at the cosmetics counter. Insist that salespersons clean container openings with alcohol before applying their contents to the skin.
- Never add liquid to a product to bring back its original consistency. Adding other liquids could introduce bacteria that can easily grow out of control.
- Stop using any product that causes an allergic reaction.
- Throw away makeup if the color changes or an odor develops. Preservatives degrade over time and may no longer be able to fight bacteria.
- Do not use eye makeup if there is an eye infection. Throw away all products used when the infection was discovered.
- Keep makeup out of sunlight. Light and heat can degrade preservatives.
- Keep makeup containers tightly closed when not in use.
- Never use aerosol beauty products near heat or while smoking because they can ignite.
- Hairsprays and powders may cause lung damage if inhaled regularly.

## **Conclusions**

Compared to the toxins found in the air, soil and waterways, cosmetics may seem a trivial pursuit to many environmental health and consumer advocacy groups. But many of the same poisons that pollute our environment, from dioxins to petrochemicals, can be found in the cosmetic products people use every day.

Consumer protection, environmental and public-health advocates say possible carcinogens and reproductive toxins do not belong in cosmetics, no matter how small the amount. Companies should be making the safest products possible, instead of trying to convince consumers that a little bit of toxic chemicals are accepted. Consumers should reduce their exposure to known harmful substances, especially because cosmetic danger is due to repeated usage.

In this context, cosmetic manufacturers should:

- Take out all possible cancer carcinogens and other developmental toxins from products;
- Ensure that ingredients are certified and free of impurities with known possible human carcinogens or developmental toxins;

- Eliminate any ingredients that qualify as harmful or unsafe.

Consumers should focus more on the chemicals they put on their body, as they can have a major influence on health, and should be helped to make a good selection of non-toxic cosmetics. Switching to all natural skin care products, natural body care products, organic and natural-make up can help consumers avoid feeding the skin harmful chemicals.

Some companies are moving slowly towards producing synthetic-free cosmetics, but experts say it is too early to judge whether these ranges are all they claim to be.

Fortunately, products are now being developed based on scientific breakthroughs to reverse environmental and aging damage to the skin and to support the biology of the skin as a living organ. This approach is returning rapid results in skin healing, wrinkle diminishment and other problems of aging skin (sagging skin, eye bags etc.).

Many formulas with these new and often exotic ingredients are exclusive to a single manufacturer, and the expense is prohibitive for the major manufacturer. Fortunately, there are independent manufacturers beginning to bring these advances to market. Some concerned consumers even started to make their own cosmetics.

For the benefit of consumers, safer products and resources are becoming increasingly accessible and popular. A variety of beauty product lines made from plant-based ingredients are available from Annemarie Borlind, Aubrey Organics, Aura Cacia, Burt's Bees, Dr. Hauschka Skin Care, Pangea Organics, Weleda and many others, but these are not available to each and every consumer, even though the prices are competitive, comparable to the majority of department store prices.

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## Preocupări actuale privind riscurile produselor cosmetice asupra siguranței și sănătății consumatorului

### Rezumat

*Utilizarea pe scară extinsă a produselor cosmetice de către categorii largi ale populației, în lipsa unei educări și informări adecvate în domeniu, alături de concluziile îngrijorătoare ale unor studii științifice de specialitate în legătură cu posibilele pericole asociate acestor produse obligă la cunoașterea și diseminarea informațiilor pe aceste teme. Articolul prezintă principalele efecte negative și riscuri cauzate de compoziția chimică a produselor cosmetice, precum și măsurile adecvate de contracarare sau evitare a acestora.*