EXPLORING THE RISK OF CONTAMINATION IN COSMETIC PRODUCTS: A COMPREHENSIVE REVIEW

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ABSTRACT: The use of cosmetics is increasing day by day, from teens to adults all are using cosmetics in their daily life. Though the demand for cosmetics also increasing. As use of cosmetics is increasing, it is important to know the side effects and awareness regarding cosmetics. The aim of this review is to provide the information about the health risk and the harmful ingredients that are being used in the cosmetics like heavy metals, fragrances, preservatives, chemicals. Some chemicals are purposely added or some are accidentally found during the production. Consumers are advised to be aware of harmful ingredients and the side effects of using cosmetics and personal or skin care products.

Key words: Cosmetics, heavy metal impurities, microbial contamination, preservatives, fragrances, health risk.

INTRODUCTION

Cosmetics are products designed for personal care, beautification makeup, skin care and fragrances. While, these products are generally safe for use, there is a possibility of contamination due to improper manufacturing, storage or handling process. Contaminants include bacteria, mold or other harmful substances. To mitigate this risk, manufacturers follow strict quality control and regulatory guidelines to ensure product safety. It’s important for consumers to be aware of expiration dates, storage instructions, and any adverse reactions to cosmetics. Always check for any changes in color, texture, or smell of the product, as these could indicate potential issues.

The ingredients used in cosmetic and beauty products are biodegradable, which allows bacteria to quickly degrade them. When customers use cosmetics, health, beauty and personal care items, they are constantly harming (or ‘challenging’) the cosmetics or toiletry products with their dirty hands. Examples of these products include mascara, eye shadow, face powder, foundation, lotions, face creams, shampoos and conditioners. With the addition of an antimicrobial, a product is made unpleasant and harmful for users. Additionally, it is acknowledged that consumer abuse may affect cosmetic items more than pharmaceutical ones. Although extreme abuse cannot be prevented, such as applying eye makeup with saliva or using shampoo in the shower with the cap off, the manufacturer should take abuse into consideration when formulating the product (Geis et al., 2020).

The possibility of undesired elements entering cosmetic goods, such as bacteria, mold, or dangerous chemicals is known as potential contamination in cosmetics. Consumers could face health risks if products are contaminated during production, packing, storage, or usage. Manufacturers follow stringent quality control procedures, safe storage practices and ingredient safety evaluations to reduce this danger. The safety of cosmetic items and lowering the risk of contamination depend heavily on routine product testing and adherence to regulatory regulations.

Importance of cosmetic product safety

Industries that manufacture cosmetics and personal care items take their responsibility to people and the environment seriously. Developers collaborate with engineers and scientists to test how the new product responds to light, temperature, and transportation after ingredients are assessed to ensure types their real-world use is safe for consumers and the environment. By doing
because it interferes with the way human hormones functions and may be hazardous to reproduction, which could reduce human fertility.

**Health risks**

**Allergic reactions:** Cosmetics especially leave on product, come in contact with the skin in close contact for extend period of time and many cause allergic responses (Richters et al., 2015). People with sensitive skin have less tolerance for the use of cosmetics and more likely to experience a variety of symptoms including tightness, burning, tingling, discomfort, pruritus and stinging and being diagnosed with allergic reactions. Limonene, on the other hand, has one of the lowest consumption rates of any allergens (Martins et al., 2022). The majority of these substances were combined in the formulations of goods where they were used, resulting in the combination of allergens that could have synergistic effects and raise the risk of sensitization. Although, they frequently found in cosmetic goods, fragrances are the most common source of allergic contact dermatitis. There are constantly new allergens emerging and the cosmetovigillance system’s case notification and reports from dermatologist immunoalergologists are typically used to identify them (Sun et al., 1981; Moennich et al., 2009).

**Eye and respiratory effects**

**Carcinogenicity:** Some products like keratin hair straighteners, purposefully include formaldehyde (Jacob et al., 2009). Formaldehyde-releasing preservatives are widely used in personal care products like eye shadow, mascara, nail polish, shampoo and blush to prevent bacterial growth (Pullen Fedinick et al., 2021). To serve as a preservatives FRP are made to release formaldehyde gradually and continuously over time (Joshua et al., 2010). Formaldehyde is classified as human carcinogen, by IARC, the National Toxicology Program (NTP) and California EPA’s preposition 65(Prop 65) (Moennich et al., 2009). Formaldehyde is classified as EPA as a potential human carcinogen. Japanese cosmetics regulations restrict the use of formaldehyde, and European commission limits the amount of formaldehyde to no more than 5% in the product (Jimbow et al., 1974).

**Depigmentation:** By reducing the skin’s production of melanin pigment hydroquinone is used topically in human medicine to lighten skin and lighten its color (Tamara Attard, 2022). Because hydroquinone lightens the skin by lowering melanin, it also increases the skin exposure to UV rays, raising the risk of skin cancer from UV exposure. It does not have the same tendency to lead to dermatitis as metals do. According to the directive, this use is prohibited in various nations including those that are members of European Union (JN et al., 2010).

**CONCLUSION**

In conclusion, many chemicals are added to the products for cosmetic purposes. These components facilitate and development of complicated compositions that improve human life through disease prevention, health maintenance, beauty enhancement and self-esteem building. The cosmetic industry is regulated, although only the most basic laws are in place. Consumers should play a part in the industries continued development and related organization ongoing reviews of the beauty chemicals and products and chemicals by remaining knowledgeable and aware of the ingredients present in the items or personal care product they use.

Ensuring the safety of cosmetics and preventing potential contamination is crucial to protect consumer’s health. Regular quality checks, adherence to industry regulation, proper storage and production hygiene are essential to mitigate the risk of contamination.

Consumer awareness and education also play a pivotal role in making informed choices about cosmetic product. Cosmetic items may not be necessarily be connected with a major health risk, especially when considering potential long-term impact given that the products may be extensively over an extended period of time. Ingredients that are either known to pose health hazards or whose safety is uncertain may be found in cosmetics and skincare products. Many cosmetics, especially hair colors and shampoos, may include substances that are known or suspected to cause cancer in humans. Once more, a lot of these products might have substances that increase penetration into the skin.

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