



THE SILENT BATTLE: HOW THE CHEMICAL WEB TRAP STEALTHILY AFFECTS HUMAN WELL-BEING

Akanksha Adhikari

Biocontrol Laboratory, Department of Zoology, Radhey Hari Government Post Graduate College, Kashipur, Udham Singh Nagar – 244713, Uttarakhand, India.

*Corresponding author: akankshaadhikari9@gmail.com

(Received on December 01, 2023; Revised on December 11, 2023 and Accepted on December 24, 2023)

ABSTRACT

Globally, there is a growing utilization of personal care products, and this expansion is accompanied by a diverse range of chemical compounds employed in their development and manufacture. Undoubtedly, these are the factors that contribute to the extension of the durability, efficacy, and excellence of the product. However, it is crucial to acknowledge the existence of both visible and invisible chemical networks that possess toxic properties, thereby posing health risks ranging from minor to fatal. In contradistinction to the detrimental constituents employed in their formulation, the ongoing research literature unveils the inherent biological hazards that cosmetics can pose to humans and the environment. This investigation establishes a connection between the primary harmful chemicals prevalent in cosmetics and potential health complications documented in scientific journals. Considering the available evidence, the purpose of this review is to highlight the need to foster advancements in the global pursuit of novel approaches to ensure quality control in the production and utilization of chemical substances in food and personal care items. The context emphasizes what is important for individuals to do to protect themselves from the risks of chemical exposure.

Keywords: chemical, human health, personal care products, cosmetics.

INTRODUCTION

From the food we eat to the air we breathe, chemicals play a crucial role in our everyday existence. Whether naturally occurring or artificially synthesized, these substances can have significant effects on our well-being. In today's fast-paced world, we rely heavily on daily products to help us navigate through our busy lives. From personal care items to household cleaning supplies, these products have become an integral part of our daily routines. Besides these materials are designed to ensure good personal hygiene and prevent bacteria, oil, and smudges through chemical changes (Khalid and Abdollahi 2021).

However, what people don't know is that a large percentage of these products typically involve nasty

chemicals that can be a big deal for our bodies. Following a review of published data, we discovered that endocrine-disrupting chemicals also negatively impact a lot of aspects mainly communication, anxiety, dominance, and other behaviour pattern, as well as understanding and other brain abilities (Zara and Penn 2004).

It is worth noting that we encounter chemicals not only through direct contact with products containing them but also through ingestion and inhalation. Food and beverages can be contaminated with phthalates through packaging or food handling processes, while indoor air can contain phthalate particles released from consumer products. As a result, the general population is continuously exposed to these chemicals, making it

crucial to understand their potential health impacts (Gao and Kannan 2020).

In this article, we'll examine the reasons why, even after learning about these products' detrimental properties and their undetectable effects, people still struggle to stop using them. And strategies for getting over it.

Why Human Health Trap Within Chemicals?

Because the use of substances possessing preservative action, emulsions, aromas, and other ingredients has expanded in the modern era due to rapid advancements, and the development of new beauty products. These compounds optimize the consistency, longevity, and quality of these kinds of personal care products; however, regular, repeated, and careless contact can be detrimental to human health.

Exploring the Lethal Power of Concentrated Chemicals

Many cosmetic products often include harsh chemicals to adapt to new enhance their efficiency, viability, and potency to breakthroughs in the industry. But, paraben and phthalate, these two substances that can ramp up in our bodies and the environment and have long-term negative health.

Parabens: A class of compounds known as parabens is repeatedly detected in many personal care and cosmetic products, as well as in some food and pharmaceuticals. Because they are easy to execute and prolong the lifespan of the manufacturing operation, even they are very effective in combating microbial growth (Halaseh et al. 2022). The fact that parabens can imitate the hormone female hormones in the body is one of the key problems influencing them. A hormone that is naturally produced, estrogen is integral to many molecular events. Moreover, normal hormone stability can be upset when the body is exposed to substances that closely resemble estrogen. Based on a particular proposed study, parabens may adhere to estrogen receptors and try to copy the outcomes of estrogen, and multiple health problems, such as hormone imbalances, reproductive issues, and some cancers, particularly breast cancer, have been associated with these interruptions (Tavares et al. 2009). However, propylparaben and methylparaben are the most frequently used and predominantly encountered reported together in cosmetic products, thin layer

chromatography has them intact in human breast tissue, which is concerning (Darbre et al. 2004). Kolatorova et al. (2018) research study is the first to investigate the simultaneous detection of parabens in these biological matrices as well as the first attempt to measure the levels of alternative bisphenols in the umbilical cord. Current studies indicate that parabens may have an impact on a fetus's development, in males to be more specific (Kolatorova et al. 2018).

Phthalate: Phthalates are a group of chemicals commonly used in the manufacturing of plastics to increase their flexibility, transparency, and durability, and to enhance their fragrance-retention properties. While phthalates have proven invaluable in enhancing the functionality of various products, research has raised concerns about their potential adverse effects on human health. Studies have indicated that exposure to phthalates is associated with a variety of health conditions, including reproductive problems, developmental issues, and endocrine disruption (Chang et al. 2021). One of the primary concerns surrounding phthalate exposure is its impact on reproductive health. These chemicals have been linked to decreased sperm quality and concentration in men, leading to potential fertility issues. Additionally, exposure during pregnancy has been associated with hearing disorders, risk of childhood asthma, and altered fetal development, such as decreased anogenital distance in males, which is an indicator of impaired reproductive function (Eales et al. 2022). Thinking about the risks of chemicals that are further transferred from the sanitary pad is concerning since women are associated with different chemicals through different mediums. But pampers and sanitary pads had dramatically higher phthalate than typical commercial synthetic materials. (Park et al., 2019). For instance, exposure to certain phthalates has been linked to disruptions in hormone levels, potentially contributing to early puberty in girls. On the contrary, the evidence shows that positive associations were only observed in boys but they did not observe any significant association of maternal phthalate metabolite levels with any of the outcomes in girls. Thus, early life exposure to phthalates may affect fetal growth through altering homeostatic and metabolic mechanisms. However, most of the research supports a positive association of phthalates with birth weight in girls than the boys (Zhu et al. 2018).

Quoting various scientific studies, the report points out numerous health hazards of phthalates. It includes endometriosis pregnancy-related



complications, issues with fetal development, insulin resistance, hypertension, and so forth. Furthermore, the major alternatives include formaldehyde and phenol, but those chemicals also have toxicity and side effects that are difficult to ignore. Therefore, more research is needed to establish alternatives to parabens (Mitra et al. 2021).

Why People Can't Call Quits on Chemical Products?

The Convenience Factor: The accessibility of daily products is a major factor in why people hesitate to throw them away. Our culture places a high value on potency and instant outcomes. These goods, which range from instant coffee to disposable diaper wipes, provide us with a convenient solution for our real-life problems. Convenience frequently triumphs over the possible long-term serious damage inflicted by the chemicals found in products.

Lack of Awareness and Transparency: To avoid the actual nature of these chemicals, manufacturers frequently employ deceptive marketing strategies or unfamiliar scientific terminology. The chemicals in these products and the long-term damage they can do to our bodies are entirely unknown to many consumers. It is going to be difficult for customers to make knowledgeable decisions about the products they use because of a lack of integrity.

How to Overcome Chemical Trap as an Individual?

While chemicals are a daily part of human life, there are several measures you can take to protect yourself from their potentially harmful effects:

Limit exposure: Try to reduce your exposure to chemicals as much as possible. This can include avoiding unnecessary chemical products, opting for natural substitutes, and diminishing your consumption of domestic chemical substances.

Read labels: Always make sure to read and comprehend the labels and warnings on all the products that you utilize. This will assist you in recognizing and preventing the usage of possibly dangerous chemicals. It is also advisable to opt for products that are specifically labeled as "chemical-free" or "paraben-

free," as these formulations generally consist of alternative compounds that are less likely to cause allergies.

Proper ventilation: Ensure that your living and working areas have adequate ventilation. Good airflow can aid in decreasing the accumulation of indoor chemicals.

Use protective equipment: When working with or close to chemicals, it is crucial to utilize suitable protective gear, including gloves, goggles, masks, or aprons. This ensures the establishment of a physical barrier between you and the chemicals.

Practice safe storage: Chemicals should be kept out of the reach of children and pets and stored correctly in their original containers. This will reduce the possibility of unintentional exposure.

Follow safety guidelines: Always abide by the manufacturer's recommended safety precautions when handling chemicals. This could entail using the product in an area with adequate ventilation, carrying safety gear, or adhering to particular storage or disposal guidelines.

Personal hygiene: Wash your hands frequently to get rid of any possible chemical residues you may have come into contact with, especially before eating.

Maintain a healthy lifestyle: A healthy immune system can help your body better withstand potential chemical exposures. Eating a balanced diet, exercising frequently, and getting enough sleep are all factors in maintaining a healthy immune system.

In addition, experts estimate that, if manufacturers abided by their care instructions, the portions of potentially dangerous substances in these products would be far lower than the documented toxic concentrations (Juhasz and Marmur 2014).

CONCLUSION

After analysing all the data, it is obvious that males are more affected than females during pregnancy by contaminant exposure. Pregnant females are impacted more than the next generation, but the opposite is true

for the male generation. Compared to girls, they have larger health implications during childbirth, and this is the concerning issue that ultimately results in infertility. But it is equally important to understand that not all chemicals are unsafe or safe. When chemicals are present in high concentrations or when exposure to them is sustained, it raises the bar of possible health concerns. To safeguard human life, it is valuable to maximize safety precautions and be aware of any possible hazards related to specific chemicals. While chemical exposures have an increasing impact on public health, it is crucial to establish cause-effect relationships between them, but this is a huge challenge. So, people still have to think long and hard about what products to buy that satisfy their needs and health, stay informed, and identify any possible risks is a protective step for an individual which is more effective against any possible chemical risks in the future.

REFERENCES

- Al-Halaseh L K, Al-Adaileh S, Mbaideen A, Hajleh M N A, Al-Samydai A, Zakaraya Z Z, Dayyih W A (2022). Implication of parabens in cosmetics and cosmeceuticals: Advantages and limitations. *J Cosmet Dermatol*, 21(8), 3265-3271. <https://doi.org/10.1111/jocd.14775>
- Błędzka D, Gromadzińska J, Wąsowicz W. (2014). Parabens. From environmental studies to human health. *Environ Int*, 67, 27-42. <https://doi.org/10.1016/j.envint.2014.02.007>
- Chang, W. H., Herianto, S., Lee, C. C., Hung, H., & Chen, H. L. (2021). The effects of phthalate ester exposure on human health: A review. *Sci Environ*, 786, 147371. <https://doi.org/10.1016/j.scitotenv.2021.147371>
- Darbre P D, Aljarrah A, Miller W R, Coldham N G, Sauer M J, Pope G S. (2004). Concentrations of parabens in human breast tumours. *J Appl Toxicol*, 24(1), 5-13. <https://doi.org/10.1002/jat.958>
- Eales J, Bethel A, Galloway T, Hopkinson P, Morrissey K, Short R E, Garside R. (2022). Human health impacts of exposure to phthalate plasticizers: An overview of reviews. *Environ Int*, 158, 106903. <https://doi.org/10.1016/j.envint.2021.106903>
- Gao C J, Kannan K (2020). Phthalates, bisphenols, parabens, and triclocarban in feminine hygiene products from the United States and their implications for human exposure. *Environ Int*, 136, 105465. <https://doi.org/10.1016/j.envint.2020.105465>
- Juhász M L W, Marmur E S. (2014). A review of selected chemical additives in cosmetic products. *Dermatol Ther*, 27(6), 317-322. <https://doi.org/10.1111/dth.12146>
- Khalid, M., & Abdollahi, M. (2021). Environmental distribution of personal care products and their effects on human health. *Ir J Pharm Re: IJPR*, 20(1), 216. <https://doi.org/10.22037%2Fijpr.2021.114891.15088>
- Kolatorova L, Vitku J, Hampl R, Adamcova K, Skodova T, Simkova M, Parizek A, Starka L, Duskova M. (2018). Exposure to bisphenols and parabens during pregnancy and relations to steroid changes. *Environ Res*, 163, 115-122. <https://doi.org/10.1016/j.envres.2018.01.031>
- Mitra P, Chatterjee S, Paul N, Ghosh S, Das M. (2021, December). An Overview of Endocrine Disrupting Chemical Paraben and Search for An Alternative—A Review. In *Proceedings of the Zoological Society (Vol. 74, No. 4, pp. 479-493)*. New Delhi: Springer India.
- Park C J, Barakat R, Ulanov A, Li Z, Lin P C, Chiu K, Zhou S, Perez P, Lee J, Flaws J, Ko C J. (2019). Sanitary pads and diapers contain higher phthalate contents than those in common commercial plastic products. *Reprod Toxicol*, 84, 114-121. <https://doi.org/10.1016/j.reprotox.2019.01.005>
- Tavares R S, Martins F C, Oliveira P J, Ramalho-Santos J, Peixoto F P (2009). Parabens in male infertility—Is there a mitochondrial connection? *Reprod Toxicol*, 27(1), 1-7. <https://doi.org/10.1016/j.reprotox.2008.10.002>
- Zala S M, Penn D J. (2004). Abnormal behaviours induced by chemical pollution: a review of the evidence and new challenges. *Anim Behav*, 68(4), 649-664. <https://doi.org/10.1016/j.anbehav.2004.01.005>
- Zhu Y, Wan Y, Zhang B, Zhou A, Huo W, Wu C, Liu H, Jiang Y, Peng Y, Xu S, Xia W, Li Y. (2018). Relationship between maternal phthalate exposure and offspring size at birth. *Sci Environ*, 612, 1072-1078. <https://doi.org/10.1016/j.scitotenv.2017.08.207>