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Understanding the Potential Risks and Uses of SLS in Daily Life

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ABSTRACT

A popular chemical in personal care goods like shampoos and cleaning solutions is sodium lauryl sulfate, or SLS. Its emulsifying and foaming qualities make it valuable. Many Concerns have been voiced about its possible negative effects on health, especially skin irritation, as well as its environmental impact. This paper discusses the history of SLS, its uses, and the safety issues that surround it. Further covered is the topic of substitute ingredients for SLS, especially in the cosmetics sector. Despite SLS's effectiveness, these results imply that safer and more environmentally friendly options exist.

Keywords*: SLS, Sodium Lauryl Sulfate, Environment, Chemistry, Risks, Alternatives.*

1. Introduction

Because of its ability to produce froth and improve cleaning efficacy, sodium lauryl sulfate (SLS) is a common ingredient in a wide range of goods, from industrial cleaners to cosmetics. SLS has been under growing scrutiny, though, as consumers grow more aware of chemical compounds. While the U.S. Food and Drug Administration (FDA) and other regulatory bodies consider it to be generally safe [2], long-term usage of it can have negative effects, including skin irritation and environmental damage when disposed of in large numbers. [4.]

1.1 Background and Discovery

SLS was first applied in industrial settings during World War II due to its strong degreasing capabilities. Its foaming properties and low-cost, made manufacturers start using it in commercial items after the war. Despite continuous discussions over its safety, SLS was a common ingredient in personal hygiene products by the middle of the 20th century. Convenience vs health dangers is still a contentious issue.[8.]

2. Chemical Composition and Properties of SLS

SLS represents an alkyl sulfate that is created when sulfur trioxide and lauryl alcohol combine, then sodium hydroxide is used to neutralize the reaction. The result is a strong surfactant that makes it easier to emulsify oils and water.[1]

2.1 Surfactant Properties

As an anionic surfactant, SLS is particularly effective in breaking down oils. Additionally, its foaming action is important to its application in cosmetics, as consumers often equate foaming with cleanliness. Nonetheless, the same properties that make SLS effective as a cleanser also contribute to its irritant potential, particularly when applied to the skin in high concentrations over extended periods.

3. Uses of Sodium Lauryl Sulfate in Everyday Products

3.1 Personal Care Products

SLS is present in various personal care items due to its ability to cleanse and produce foam. Common products include:
Shampoos and Conditioners: Used to break down oils on the scalp.
Toothpaste: Provides a foaming effect for even distribution.
Body Washes and Soaps: Removes dirt and oil from the skin.
Facial Cleansers: Strips oil, but may lead to irritation with prolonged use.[6]
Although these applications appear beneficial, the drawback is that long-term exposure to SLS might result in skin irritation and worsening of existing skin disorders.

3.2 Industrial and Household Cleaning Products

SLS is useful in industrial cleansers, such those used for degreasing engines or machinery, because of its grease-cutting properties. Given its harsh chemical qualities, however, its usage in personal care products is more debatable.

3.3 Food Additive

While SLS is allowed in small amounts as a food additive in the US [2.], the European Union forbids its use in food because of health concerns. This calls into question consumer safety and disparities in regulations.[9.] [3.]

4. Health Concerns Associated with SLS

4.1 Skin Irritation and Inflammation

The most well-documented side effect of SLS is its tendency to cause skin irritation. Studies have shown that when used at high concentrations, SLS can strip the skin of natural oils, leading to dryness, irritation, and even contact dermatitis in some individuals. A study correlating the level of ceramides in the skin with irritation caused by SLS concluded that individuals with compromised skin barriers are more susceptible to irritation from SLS-containing products. [4.]

4.2 Irritation in Mucous Membrane

Aside from skin irritation, there have been concerns about the potential long-term effects of SLS exposure, although definitive links to serious health conditions have not been conclusively established. Some consumers express concerns about its use in oral care products, fearing potential mucosal irritation. [1.]

5. Environmental Impact

The environmental persistence of SLS is another critical concern. SLS is known to be biodegradable, but its widespread use in detergents and personal care products means large quantities of this chemical enter water systems, where it can negatively affect aquatic organisms. Moreover, the production of SLS often involves palm oil, the harvesting of which has been linked to deforestation and habitat destruction, leading to broader environmental consequences. [1.]

6. Synonyms of SLS

Instead of SLS or Sodium Lauryl Sulfate can be used by different names. This is often done by manufacturers to hide its presence as an ingredient in the product.
Some examples of its synonyms are-:
- Sulfuric acid monododecyl ester sodium salt
- Sodium dodecyl sulfate
- Dodecyl sulfate, sodium salt
- Laureth-8 carboxylic acid, sodium salt
- PEG-5 lauryl ether sulfate sodium salt
- PEG-7 lauryl ether sulfate sodium salt
- Polyethylene glycol 5 lauryl ether sulfate sodium salt
- Polyethylene glycol 7 lauryl ether sulfate sodium salt

And more. [8.]

7. Alternatives to SLS

As the possible risks connected to SLS become more widely known, many producers and consumers are looking for substitute components. Plant-based surfactants like lauryl glucoside and decyl glucoside, as well as sodium coco-sulfate, which is made from coconut oil, are some safer, more environmentally friendly substitutes. While these substitutes have comparable foaming qualities, they are typically thought to be gentler and less prone to irritate skin. [5.]

8. Conclusion

Even though Sodium Lauryl Sulfate is still a common and useful element in a lot of consumer goods, there are still concerns to the environment and human health that need to be considered. It appears that customers have the choice to lessen or completely avoid their exposure to SLS given the growing availability of safer substitutes. The sustainability and safety of chemical compounds like SLS in everyday items need to be continuously evaluated by producers, regulatory bodies, and consumers.

References:

[1] National Library of Medicine on SLS and its safety
[2] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4651417/
[3] Bondi CA, Marks JL, Wroblewski LB, Raatikainen HS, Lenox SR, Gebhardt KE. Human and Environmental Toxicity of Sodium Lauryl Sulfate (SLS): Evidence for Safe Use in Household Cleaning Products. Environ Health Insights. 2015 Nov 17;9:27-32. doi: 10.4137/EHI.S31765. PMID: 26617461; PMCID: PMC4651417.
[4] U.S. FDA on SLS usage
[5] CFR - Code of Federal Regulations Title 21
[6] Chemical Safety Facts on SLS
[7] https://www.chemicalsafetyfacts.org/chemicals/sodium-lauryl-sulfate/
[8] Research on SLS-related skin irritation
[9] https://pubmed.ncbi.nlm.nih.gov/8917825/

[10] di Nardo A, Sugino K, Wertz P, Ademola J, Maibach HI. Sodium lauryl sulfate (SLS) induced irritant contact dermatitis: a correlation study between ceramides and in vivo parameters of irritation. Contact Dermatitis. 1996 Aug;35(2):86-91. doi: 10.1111/j.1600-0536.1996.tb02296.x. PMID: 8917825.
[11] SLS alternatives from School of Natural Skincare
[12] How to Avoid SLS in your Beauty Products (and what to use instead!) - School of Natural Skincare
[13] 6.https://www.scienceabc.com/pure-sciences/are-shampoos-with-sulfate-bad-for-you.html
[14] 7.https://www.harrogateorganics.co.uk/blogs/news/is-sodium-lauryl-sulfate-sls-really-that-bad-for-you
[15] 8. "Master Chemist Explains the Reality Behind Sodium Lauryl Sulfate," Morocco Method Blog.
[16] https://shop.morroccomethod.com/blogs/scalp-health/master-chemist-explains-the-reality-behind-sodium-lauryl-sulfate-and-its-multiple-names
[17] 9. European Union cosmetics regulations on labeling and chemical use.
[18] https://www.ema.europa.eu/en/documents/report/sodium-laurilsulfate-used-excipient-report-published-support-questions-and-answers-sodium-laurilsulfate-used-excipient-medicinal-products-human-use_en.pdf
[19] 10. https://stppgroup.com/understanding-sodium-lauryl-sulfate-sls-and-alpha-olefin-sulfonate-aos-in-personal-care-products-a-comparative-analysis/
[20] 11. https://www.brillachem.com/news/understanding-the-uses-of-sodium-lauryl-sulfate/