Toothpaste, Shampoo and Body Wash

Background to the controversy

Toothpaste, soap, shampoos, bath products and moisturisers often contain the chemicals sodium lauryl sulfate (SLS) and sodium laureth sulfate (SLES). These two chemicals are very closely related.

The claim that sodium lauryl sulfate and sodium laureth sulfate cause cancer has been spread by emails and websites. The suggestion usually is that they are harsh chemicals used to clean garage floors, and are carcinogenic (cancer causing) when used to clean skin. This claim is sometimes made by manufacturers of natural products to convince consumers to buy their products.

In August 2014, there was a worldwide media focus on the use of triclosan in some toothpastes, with some articles drawing a link between the ingredient and cancer.[1]

Current evidence

Sodium Lauryl Sulfate and Sodium Laureth Sulfate

Sodium lauryl sulfate is used as a foaming agent and detergent in many skin care products.

The US Cosmetic Ingredient Review (CIR) – an independent expert panel representing consumers, industry and government set up to assess the safety of ingredients used in cosmetics – published an ingredient alert for the chemicals sodium lauryl sulfate, sodium laureth sulfate (collectively, SLS) and ammonium lauryl sulfate.

This ingredient alert warned that SLS can irritate the eyes and skin, and its irritant properties are higher at greater concentrations. Additionally, the longer SLS is in contact with the skin, the more likely it is to irritate. Hence, the alert warned that SLS is safe for brief use after which it is rinsed away, as used in the shower or when brushing teeth. In products which remain on the skin for prolonged periods of time, such as moisturiser and cosmetics, SLS concentrations should not exceed 1%.[2]

In Australia, the National Industrial Chemicals Notifications and Assessment Scheme (NICNAS) reviewed studies on the safety of sodium lauryl sulfate. It found only one study designed to examine the carcinogenic effects of sodium lauryl sulfate, which was done on beagle dogs. This study found that sodium lauryl sulfate was not carcinogenic in dogs. NICNAS also found that even at high doses, sodium lauryl sulfate had no effect on fertility or development.[3]

Sodium laureth sulfate has an emulsifying action (combining oil and water), which is how it removes oil and soil.

Like sodium lauryl sulfate, it has been shown to irritate the eyes and skin in human and animal studies. The severity of irritation increases with the concentration of sodium laureth sulfate. Like sodium lauryl sulfate, there is no evidence that sodium laureth sulfate is carcinogenic. The CIR has assessed the safety of sodium lauryl sulfate and sodium laureth sulfate and concluded that they are safe.[2]

The US Report on Carcinogens is a list of known or reasonably anticipated human carcinogens (cancer causing substances). Neither sodium lauryl sulfate nor sodium laureth sulfate are included in this list.[4]

1,4 Dioxane

1,4 dioxane is a contaminant that may be present in trace amounts in some consumer products. It is formed as a by-product of the manufacturing process for sodium laureth sulfate. 1,4 dioxane is regarded as 'possibly carcinogenic to humans' by the International Agency for Research on Cancer (IARC)[5] and other leading cancer agencies. However, the public health risk posed by 1,4 dioxane in consumer products is likely to be very low because of improved manufacturing processes, the low concentration and the fact that consumer products are immediately rinsed off the skin.[6] There are scientific uncertainties and the evidence continues to evolve.

Triclosan

Triclosan is an antibacterial and antifungal agent that is added to many cosmetics and personal care products in Australia, including some toothpastes. Triclosan in toothpaste has been proven to prevent gingivitis (gum disease).[7]

In May 2009, triclosan was the subject of a full risk assessment by the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) within the Department of Health. The report identified two animal studies in rats and hamsters but noted that these provided no evidence of a carcinogenic (cancer causing) potential. [8] Further, NICNAS concluded that, "under normal conditions of consumer use, the risk of adults and children being exposed to levels of triclosan that would lead to chronic health effects is low."

The Advisory Committee on Chemicals Scheduling (ACCS) established a maximum concentration of 0.3% for triclosan in cosmetics and personal care products in Australia.[9] This is the same limit set by the European Union, as exposure at or below this level has not been associated with any adverse health risks.[10]

In the US, the use of triclosan as an active ingredient in antibacterial hand and body wash products has been phased out by the Food and Drug Administration (FDA). The FDA found that there was no evidence these products were more effective than plain soap and water for preventing infection, and could pose risks such as bacterial resistance or hormonal disruption.[11] Triclosan is still approved in the US for use in toothpaste and in products used in hospital.

Summary

There is no evidence that sodium lauryl sulfate or sodium laureth sulfate cause cancer. NICNAS has advised that prolonged exposure to these chemicals may cause skin and eye irritation. Products that contain these chemicals should be used according to the directions on the label. Trace contamination of consumer products with 1,4 dioxane (a by-product) is more concerning, although the health risk is likely to be minimal and is the subject of ongoing scientific investigation.

Triclosan in toothpaste has been proven to prevent gum disease. At this stage, there is no evidence of sufficient quality that triclosan in toothpaste causes cancer. There is concern, however, that triclosan used in antibacterial hand and body soaps may reduce the effectiveness of antibiotics in the long term and may have hormonal effects. Health authorities around the world continue to monitor the safety and efficacy of triclosan when used in this way.

References

1. See, for example, Bagshaw, E, 'Colgate Total toothpaste under scrutiny over ingredient' *The Sydney Morning Herald* 20 August 2014. Available at: http://www.smh.com.au/nsw/colgate-total-toothpaste-under-scrutiny-over-ingredient-20140821-1062ws.html

2. Cosmetic Ingredient Review (CIR). *SLS (Sodium Lauryl Sulfate), Sodium Laureth Sulfate, and Ammonium Laureth Sulfate* Ingredient Alerts. Available from: http://www.cir-safety.org/sites/default/files/imports/alerts.pdf

3. National Industrial Chemicals Notification and Assessment Scheme (NICNAS). Human Health Tier II Assessment for Sodium, ammonium and potassium lauryl sulfate. 2013. Available at: http://www.nicnas.gov.au/chemical-information/imap-assessments/imap-group-assessment-report?assessment_id=1843.

4. US Department of Health and Human Services, *14th Report on Carcinogens*. 2016, Public Health Service - National Toxicology Program.

5. International Agency for Research on Cancer (IARC). Summaries & Evaluations. Volume 71 (1999). 1,4 Dioxane (Group 2B). Available at: http://www.inchem.org/documents/iarc/vol71/019-dioxane.html

6. US Food & Drug Administration (FDA). 1,4 Dioxane: A Manufacturing Byproduct. July 2007. Available at: https://www.fda.gov/Cosmetics/ProductsIngredients/PotentialContaminants/ucm101566.htm

7. Davis RM, Ellwood RP, Davies GM, *Triclosan-containing toothpastes reduce plaque and gingivitis.* Evidence-based dent, 2005. 6:33.

8. Australian Government, Department of Health and Ageing, National Industrial Chemicals Notification and Assessment Scheme (NICNAS), *Priority Existing Chemical Assessment Report No. 30 - Triclosan,* 2009: Canberra. Available at: http://www.nicnas.gov.au/chemical-information/factsheets/chemical-name/triclosan

9. Advisory Committee on Chemicals Scheduling (ACCS), *Reasons for Final Decisions by Delegates of the Secretary to the Department of Health and Ageing for Amendments to the Poisons Standard,* March 2011: Canberra.

10. European Union, Public Health, *Triclosan and Antibiotics resistance,* 2011. Available at: http://ec.europa.eu/health/scientific_committees/opinions_layman/triclosan/en/l-2/2-uses-cosmetics-disinfectant.htm#1

11. Food and Drug Administration (FDA). News. 2 September 2016. Available at: https://www.fda.gov/newsevents/newsroom/pressannouncements/ucm517478.htm