

Final Report on the Safety Assessment of Sodium Lauryl Sulfate

Sodium Lauryl Sulfate is an anionic surfactant used in cosmetics and industrial chemicals as a cleansing agent. In absorption, metabolism and excretion studies, Sodium Lauryl Sulfate had a degenerative effect on the cell membranes because of its protein denaturing properties. High levels of skin penetration may occur at even low use concentration.

Sodium Lauryl Sulfate had an LD 50 (Lethal Dose for 50% of the animals tested) of 0.8 to 1.10 g/kg in rats. A formulation containing 15% caused depression, labored breathing, diarrhea and death in 4 out of 20 animals.

In acute ocular tests, 10% Sodium Lauryl Sulfate caused corneal damage to the rabbits' eyes if not irrigated or irrigation was delayed. A Draize test of a product containing 5.1% Sodium Lauryl Sulfate caused mild irritation and products containing 21% were severely irritated with no rinse and mildly irritated when rinsed.

Acute animal skin irritation studies of 0.5% to 10% Sodium Lauryl Sulfate cause slight to moderate irritation. Applications of 10% to 30% caused skin corrosion and severe irritation. Solutions above 20% were highly irritating and dangerous. One percent and 5% Sodium Lauryl Sulfate produced a significant number of comedones when applied to the pinna of albino rabbits.

A chronic oral feeding study in rats of 0.25%, 0.5% and 1.0% Sodium Lauryl Sulfate in the diet for two years produced no observable abnormalities except for moderate to severe dermal effects. In mutagenesis studies, rats fed 1.13% and 0.56% Sodium Lauryl Sulfate in the diet for 90 days produced no more chromosomal aberrations or clastogenic effects than did a normal diet.

Sodium Lauryl Sulfate was tested for human skin irritation in concentrations ranging from 0, 1% to 10%. Open patches were less irritating than closed patches, and irritation increased directly with concentration. For prolonged contact with skin concentrations should not exceed 1%.

CHEMICAL AND PHYSICAL PROPERTIES

Sodium Lauryl Sulfate, an anionic surfactant, is prepared by the sulfation of commercially available lauryl alcohol from coconut oil, with either sulfur trioxide or chlorosulfonic acid. The product of this reaction is then neutralized with aqueous sodium hydroxide. (lye) The abbreviated symbol for Sodium Lauryl Sulfate is SLS.

Sodium Lauryl Sulfate is used around the world in clinical studies as a skin irritant. SLS is the universal standard, by which a measured percentage is evaluated to promote a given level of irritation and reaction. By this SLS standard level of irritation, it is then possible to evaluate the healing or modifying characteristics of any ingredient or formula used on the SLS irritated skin.

Carcinogenic nitrates can form in the manufacturing of Sodium Lauryl Sulfate or by its inter reaction with other nitrogen bearing ingredients within a formulation utilizing this ingredient.

Tests show permanent eye damage in young animals from skin contact in non eye areas. Studies indicated Sodium Lauryl Sulfate kept young eyes from developing properly by possibly denaturing the proteins and not allowing for proper structural formation. This damage was permanent.

Other studies have indicated that Sodium Lauryl Sulfate enters and maintains residual levels in the heart, the liver, the lungs and the brain from skin contact. This poses question of it being a serious potential health threat to its use in shampoos, cleansers, and toothpastes.

Still other research has indicated SLS may be damaging to the immune system especially within the skin. Skin layers may separate and inflame due to its protein denaturing properties.

A higher foaming and slightly less irritating modification of Sodium Lauryl Sulfate can be manufactured by ethoxylation of the surfactant. The modified compound becomes known as Sodium Lauryl Ether Sulfate. The cosmetic name is Sodium Laureth Sulfate with an abbreviated symbol of SLES.