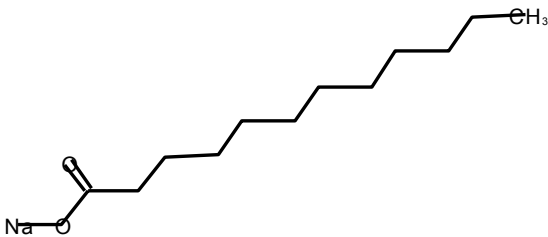


This document presents data that P&G scientists are using to perform environmental risk assessment. This is not a compilation of all the data that may be available.

Soap

I. Chemical Identity

Chemical Name	Soap (Data shown is for Lauric acid, sodium salt, as an example of the soap category)
Chemical Structure	
Synonym	<p style="text-align: center;">SODIUM</p> <p>Soap is defined here as a generic name for all fatty acids with even numbered chainlengths, ranging from C₁₂ to C₁₈, saturated and unsaturated versions, and their sodium salts. This category includes lauric acid, myristic acid, palmitic acid, stearic acid, oleic acid, linoleic acid, sodium laurate, sodium myristate, sodium palmitate, sodium stearate, sodium oleate and sodium linoleate</p>
SMILES	[Na]OC(=O)CCCCCCCCC
Function	<p>Cleaner. Soap is one of mankind's earliest cleaners. There is evidence that soap was being used for personal cleansing as early as 1500 B.C.. Soap is actually a large class of compounds, all of which consist of molecules composed of a fatty acid bound to a metal ion. Depending on the type of soap, the length and shape of the fatty acid will vary as will the metal ion it is bound to (sodium, magnesium, calcium, etc.).</p>
	Personal cleansing agent

II. Physical and chemical properties

	Value	Unit	Reference
Molecular Weight (acid)	199.3	g/mole	calculated
Molecular Weight (salt)	222.3	g/mole	HERA,2003
Solubility	22.0	g/litre at 24°C	HERA,2003
Log K _{ow}	1.2		HERA,2003
Melting Point	217	°Centigrade	HERA,2003
Vapour Pressure (at 25°C)	2.0E-8	Pascal	HERA,2003



Ingredient Safety Information

Phys-chem, Environmental Hazard, and Fate data

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III. Environmental effects

Aquatic toxicity to freshwater organisms	<p>Soap is not toxic to aquatic organisms. Reported EC₅₀ values for algae, fish, and <i>Daphnia</i> are 53.0 mg/L (Huber, 1991), 11.0 mg/L (Ontisuka <i>et al.</i>, 1989) and 10.2 mg/L (lauric acid, P&G internal data, geometric mean of 3 studies), respectively. Other environmental effects data includes a LC₅₀ of 112.3 mg/L for Bluegill sunfish (lauric acid, P&G internal data, geometric mean of 2 studies) and a EC₅₀ of 200 mg/L for <i>Brachionus calyciflorus</i> (lauric acid, P&G internal data).</p> <p>As the solubility of soap is lower in environmentally relevant waters than well water, the bioavailability of soap is generally lower in environmentally relevant waters. Thus, it is generally accepted that soap is even less toxic in aquatic environments than under laboratory conditions using clean water (HERA, 2003).</p>
Terrestrial toxicity	No existing studies known for sodium laurate.
Bioaccumulation potential	"There is no evidence of bioconcentration in fish of the C12 fatty acid sodium salt (Van Egmond <i>et al.</i> 1999)." (HERA, 2003).

IV. Environmental Fate

Biodegradability	<p>Soap is readily and completely biodegradable as shown by:</p> <ul style="list-style-type: none">- Passes OECD Ready test (P&G internal data) <p>There are no persistent metabolites formed during biodegradation.</p>
Removal in wastewater treatment plant	<p>Soap is well removed in wastewater treatment plants:</p> <ul style="list-style-type: none">- 99.7% removal aerobic wastewater treatment (HERA, 2003)
Biodegradability in soil	The degradation half-life of "soap" in soil is 36 days (1st order K value = 0.0191 day ⁻¹) (Prats <i>et al.</i> , 1996).
Partition coefficients to solids	No known studies

V. Literature references

HERA, 2003	Human and Environmental Risk Assessment on Ingredients of European household cleaning products. Fatty Acid Salts (Soap). September, 2003.
Huber, 1991	Huber, 1991. Untersuchungen über die Elimination der biologischen Abbau und die aquatische Toxizität von Seifen in Wasch- und Reinigungsmitteln. Bundesministerium für Forschung und Technologie. <i>KfK OTWTF ozwa</i> 86:731
Ontisuka S. <i>et al.</i> , 1989	Ontisuka S., Kasai Y., Yoshimura K., (1989). Quantitative Structure Activity relationship of fatty acids and the sodium salts to aquatic organisms. <i>Chemosphere</i> 18:1621-1631.
Prats <i>et al.</i> , 1996	Prats D., Rodriguez M., Varo P., Moreno A., Ferrer J. (1996) Biodegradation of soaps in anaerobic digestors and on sludge amended soils. Proceedings of the 4 th World Surfactants Congress, Barcelona, 3-7VI:233-245. CESIO.
Van Egmond <i>et al.</i> 1999	Van Egmond, R, Hambling, S, Marshall, S, (1999) Bioconcentration,



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biotransformation and chronic toxicity of sodium laurate to Zebrafish (*Danio rerio*). *Environmental Toxicology and Chemistry*. 18(3): 466-473.