



The Disposal of Soaps and Detergents

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A brief history of soaps and detergents

Old-fashioned soap worked because it was made up of chemicals called ‘surfactants’, which lowered surface tension in water and broke down fatty materials—in other words, they decreased the fabric’s hold on the dirt and they also dissolved some dirt particles. In the early 20th century, as people became more familiar with bacteria as a cause of disease, antiseptic chemicals such as ‘carbolic’ (phenol) were added to household washing materials.

These original soaps did not degrade in the environment and their residues remained in waterways and water treatment plants. By the 1950s, drains and rivers often carried persistent mounds of foam, and the water became toxic to small organisms living in the water.

Manufacturers therefore sought to make washing powders ‘biodegradable’—to decompose naturally as soon as possible after use. Water hardness is a significant factor in the effectiveness of modern detergents; the harder the water, the more detergent is required. The ions in ‘hard’ water, particularly of calcium and magnesium, bind to the surfactant components and leave an unpleasant scum on the water—and clothes.

So manufacturers added ‘builders’, which bind to and essentially remove these ions and, in doing so, ‘soften’ the water. (You can tell the difference between water that has been passed through a water softener and water that hasn’t and remains hard, by the ‘sudsiness’ of soap used in the shower).

Phosphates have been the builder most commonly used in detergents. However, because excess phosphates cause problems in our waterways, some detergent manufacturers have developed ‘phosphate-free’ detergents. (Although these detergents are marketed as such, they are not always entirely phosphate free).

What does ‘biodegradable’ mean?

The term ‘biodegradable’ refers to the ability of a material to be broken down, by a group of biological organisms called decomposers, into various other compounds. Decomposers are a necessary component of a balanced ecosystem present in natural waters and sediments, and are encouraged in sewage treatment works. Bacteria are the most common decomposers.

The Australian Standard for biodegradability (AS1792—*Methods to Determine the Biodegradability of Surfactants*) requires 80% of the mixture to be degraded within 21 days if the product is to carry the label ‘biodegradable’.

Sometimes, biodegradation can change materials such as phosphate compounds from a biologically unavailable form into a form that can be taken up and used by organisms.

Phosphate detergents

When phosphate detergents are used, disposal of the wastewater is an issue. The breakdown of phosphorus complexes in detergent wastewater (and other household products, as well as human and industrial wastes that contain phosphates) creates freely available phosphates; these can contribute to an oversupply of phosphate in waterways and cause an imbalance of the aquatic ecosystem, with the following results:

- Excessive algal growth (sometimes in the form of algal blooms) can occur with the addition of available phosphates to the freshwater system. Generally, the naturally low levels of phosphates in our soils and waters limit the phosphates in the freshwater bodies of southern Australia. Blooms of cyanobacteria (blue-green algae) may also be toxic. This toxicity may be acute (short-term severe) or chronic (longer-term low-level), and can be carcinogenic.
NOTE: Most algae are an important part of the ecosystem; only in **excess** are they a problem.
- Decomposer organisms that require oxygen may increase, which can deplete the amount of oxygen dissolved in the water. Excessively large numbers of decomposers may reduce the oxygen levels to the extent that other aquatic organisms die from lack of oxygen. Decomposer populations grow in response to an increase in their food, such as detergent components and, in the drier summer months, the dying excess algae.

Using biodegradable phosphate detergents is advantageous **only** if detergent wastewater is directed to the sewage system **and** the treated effluent is re-used to grow plants. The South Australian government plans to increase the reuse of treated effluent for irrigation on land. A well-managed reuse program can have an overall beneficial effect on the environment.

Phosphate-free detergents

Disposal of phosphate-free detergent wastewater is also an environmental issue. As an alternative to phosphates, manufacturers can use a builder, or combination of builders, including zeolites (aluminosilicates), sodium citrate and nitrilotriacetate (NTA). Detergent wastewaters containing alternative builders also have environmental impacts and must be treated by sewage treatment works. Some of them (alkyl phenols) are oestrogen mimics that can have serious detrimental effects on populations of aquatic animals, such as decreasing their ability to reproduce. Even after treatment, the environmental impacts of some alternative builders remain.

Your obligations

The principal legislation addressing pollution in South Australia is the *Environment Protection Act 1993* (the Act). In particular, section 25 imposes the general environmental duty on all persons undertaking an activity that may pollute, to take all reasonable and practicable measures to prevent or minimise any resulting environmental harm.

The *Environment Protection (Water Quality) Policy 2003* (Water Quality Policy) offers the most specific protection for the state's waters. The Water Quality Policy prohibits the pollution of the stormwater system and our natural waters. It has general obligations with which every person, business and industry must comply, as well as specific obligations for particular activities. Failure to comply with any of these obligations may result in a \$300 fine, Environment Protection Order, and/or prosecution.

Clause 17 (1) of the Water Quality Policy states that a person must not discharge or deposit a pollutant listed in Part 1 of Schedule 4 of the Policy *into any waters or onto land where it might enter any waters*. The pollutants listed in Schedule 4 Part 1 include:

- cleaning agents

- detergents and their by-products
- washdown water from cleaning animals or animal enclosures
- washdown water from cleaning vehicles, plant or equipment
- washdown water from commercial or industrial premises or wharves.

For more information on the Water Quality Policy visit the EPA web site at www.epa.sa.gov.au, or telephone (08) 8204 2004 (Freecall 1800 623 445 for country callers).

How can you help?

Biodegradable detergents cause problems if they enter our stormwater systems, streams, rivers and ultimately the ocean.

No matter which detergent you use, always direct your wastewater to the sewer or use it to irrigate your garden (without allowing any runoff).

Both phosphate and phosphate-free detergent wastewaters have negative impacts on our waterways, whether or not they are biodegradable. Directing the wastewater to the sewer allows wastewater treatment plants to remove up to 90% of phosphates.

Help the environment by making sure contaminated water does not pollute our stormwater system.

Follow the steps below and refer to the EPA's *Stormwater Pollution Prevention Code of Practice for the Community* and/or the *Easy Ways to Cleaner Water* fact sheet for more advice on how to do the right thing.

- Wash your car on the lawn or take it to a commercial car wash that recycles its wastewater.
- Dry-sweep footpaths and driveways and place sweepings in the bin. If you have an SA Water permit to wash down areas, make sure all of the water is contained and not allowed to run into the street gutters and stormwater drains.
- Place an absorbent material, such as sand or kitty litter, on grease patches, then scrape it up and place it in a bin.
- Do not hose down paths or driveways. Mop or scrub and direct the wastewater into the sewer as you would when cleaning inside your house.

FURTHER INFORMATION

Legislation

Legislation may be viewed on the Internet at: www.parliament.sa.gov.au/dbsearch/legsearch.htm

Copies of legislation are available for purchase from:

Government Information Centre
Lands Titles Office, 101 Grenfell Street
Adelaide SA 5000

Telephone: 13 23 24
Internet: shop.service.sa.gov.au

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