

# REMOVAL OF DETERGENT SURFACTANTS IN WASTE-WATER TREATMENT PLANTS

The surfactants present in detergent products remain chemically unchanged during the washing process and they are discharged down the drain with the dirty wash water. In the vast majority of cases, the drain is connected to a sewer and ultimately to a waste-water treatment plant; where the surfactants present in the sewage can be removed by biological and physical-chemical processes. European Law now requires efficient treatment of urban waste water and all but the smallest conurbations must comply before the end of 2005 (1).

In the early 1960's occasional instances of foaming were observed both in waste-water treatment plants and in surface waters receiving effluents. This phenomenon was shown to be due to the use in detergent products of a poorly biodegradable surfactant; which, consequently, was insufficiently removed during the treatment process. Industry reacted rapidly by replacing the problematic surfactant with a biodegradable equivalent. Since this time the removal of detergent surfactants in waste-water treatment plants has been the subject of much research; by industry, academia and regulatory authorities.

In the light of its own research results (including monitoring studies) and the many scientific papers published in the literature, the Industry has been confident that the key detergent surfactants are removed to a very high degree in waste-water treatment plants, and do not constitute a risk to the environment.

This belief has been confirmed in a joint monitoring and risk assessment programme carried out in The Netherlands by the European Detergents and Surfactants Industry in conjunction with the Regulatory Authorities (2). Seven treatment plants were selected to represent different plant types and sizes and different degrees of loading. Surfactants studied included soap and the major detergent surfactants linear alkylbenzene sulphonate; alcohol ethoxylates; alcohol ethoxysulphates and alcohol sulphates. The extensive monitoring study showed that all surfactants studied were removed during the treatment process by more than 99%. Thus, the extent of elimination of the surfactants was found to exceed the removal of most other organic materials present in waste waters.

Further ecotoxicological consideration of the environmental concentrations of surfactants, after dilution in surface waters of the final treated effluent from waste water treatment, led to the conclusion that in The Netherlands the risks posed to the aquatic environment by the key detergent surfactants are negligible. Taking into account detergent composition and consumption across the EU member states, this conclusion is generally applicable.

The detergent surfactants in the above-mentioned study are readily biodegradable according to the OECD criteria and therefore fulfil the (ultimate) biodegradability requirements of the proposed Detergent Regulation. Consequently, it can be expected

that surfactants meeting the proposed biodegradability criteria will be removed in biological waste water treatment plants to a similar extent, i.e. at least > 95%.

## REFERENCES

1. Council Directive 91/271/EEC of 21 May 1991 concerning urban waste water treatment.
2. T.C.J. Feijtel & E.J. van de Plassche, RIVM Report no. 679101 025, September 1995