Council for LAB/LAS Environmental Research

EXECUTIVE SUMMARY

The Council for LAB/LAS Environmental Research (CLER) is an organization of scientists and technical specialists representing member companies CEPSA Quimica, S.A. (Madrid), Huntsman Corporation (Houston), and Sasol North America (Houston). **CLER's mission is to evaluate data, conduct research and distribute scientific information on the environmental safety of the world's number one cleaning agent (surfactant), linear alkylbenzene sulfonate (LAS) and the material from which it is produced, linear alkylbenzene (LAB).**

For over fifty years, LAS has been the major surfactant used in laundry detergents and other cleaning products. Supporting this long history of safe use is an enormous database of environmental research on LAS which includes numerous peer-reviewed scientific publications and extensive data compilations. This research has looked at virtually every environmental compartment that might be exposed to LAS and considered all the components of commercial LAS.

Cleaning product ingredients such as LAS typically go down the drain after use and flow into municipal sewage treatment plants or domestic septic systems. In some cases, more common in less developed parts of the world, disposal is directly into streams, rivers or the oceans.

Many studies have been conducted in the U.S. and in Europe on what happens to LAS during sewage (wastewater) treatment. Biological breakdown (biodegradation) of LAS actually begins in the raw sewage before it reaches the treatment plant. Once LAS reaches the wastewater treatment plant, it is rapidly biodegraded and extensively removed. In modern treatment plants, LAS removal often exceeds 99%.

Treated water from wastewater treatment plants is returned to streams, rivers or the oceans. LAS concentrations in the water and sediments of streams, rivers and oceans receiving treated water are very low and pose no risk to the organisms present. Any remaining LAS will continue to biodegrade until it is either incorporated into cell biomass or completely broken down (mineralized) to water, carbon dioxide and sulfate salts.

During sewage treatment, solids are separated from water, and some LAS adsorbs to the solids. These solids, called sludge, can be incinerated, placed in landfills or used as a soil conditioner or fertilizer. LAS does not harm crops planted in soil fertilized with sludge. Residual LAS continues to biodegrade so that yearly applications of sludge to agricultural lands do not cause any buildup of LAS.

LAS is also rapidly biodegraded and efficiently removed in septic systems, thereby protecting groundwater resources. Regarding disposal of untreated wastewater, a comprehensive

assessment of the Balatuin River in the Philippines found that LAS biodegrades faster than the other biodegradable material in wastewater, measured as BOD levels, and thus BOD levels, not LAS levels, were the critical factor in determining water quality.

Commercial LAS contains small amounts of three constituents in addition to LAS itself: linear alkylbenzene (LAB), dialkyltetralin sulfonate (DATS) and methyl-branched alkylbenzene sulfonate (isoLAS). LAB, DATS and isoLAS have been shown to biodegrade rapidly and completely, and are safe for the organisms present in the environment.

Anaerobic biodegradation refers to biodegradation under oxygen-free (anoxic) conditions. In recent years, ecolabel programs in Europe have imposed a requirement for anaerobic biodegradation of the surfactants used in laundry and cleaning products. As is frequently the case with biodegradation data, the available information regarding the anaerobic biodegradation of LAS is sometimes contradictory. Much of the contradiction is a result of the unrealistic requirements built into the experimental guidelines. LAS has been shown to undergo anaerobic biodegradation in certain anoxic marine sediments and bio-reactors, vessels designed to facilitate treatment of wastewater by microorganisms. However, anaerobic biodegradation is not relevant to environmental safety for substances such as LAS that rapidly and completely biodegrade under aerobic conditions, which predominate in the real world environment. Consequently, a requirement for anaerobic biodegradation is not supported by the available science.

Over the years, the environmental safety and acceptability of LAS has been repeatedly confirmed in several major regulatory decisions including a comprehensive assessment of the available health and environmental data on LAS by the international Organization for Economic Cooperation and Development (OECD LAS SIDS Dossier, http://www.chem.unep.ch/irptc/sids/OECDSIDS/LAS.pdf), the 2013 updated HERA Project health and environmental risk assessment of LAS use in household and cleaning products in Europe (http://www.heraproject.com/files/HERA-LAS%20revised%20April%202013%20Final1.pdf) and a comprehensive 2014 report on the "Environmental Safety of the Use of Major Surfactant Classes in North America" (http://www.tandfonline.com/doi/abs/10.1080/10739149.2013.803777#.VA-gDxYo5sc). A complete set of the most up-to-date health and environmental safety data on LAS is available from the REACH chemicals registration program website (https://echa.europa.eu/registration-dossier/-/registered-dossier/15879). LAS is listed on the Safer Chemical Ingredients website (www.epa.gov/dfe/saferingredients.htm) as a substance that meets the criteria of the U.S. EPA Designed for the Environment (DfE) Safer Products Labeling Program. This list is intended to assist product manufacturers in identifying chemicals that the DfE program has evaluated and identified as safer for the environment.

The vast database on LAS, more extensive than on any other surfactant, provides complete and continuing assurance that LAS is environmentally safe and acceptable, and that LAS will be recognized as such for the foreseeable future.

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