Dialogue

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An information service from the Lignin Institute

Lignin and the Environment

Lignins have been used for many years on road surfaces, in pesticide formulations, in animal feedstock, and other products that contact food. As a consequence, lignin manufacturers have performed extensive studies to test lignin's impact on the environment. Results show that lignins are safe for the environment and not harmful to plants, animals and aquatic life when properly manufactured and applied.

Lignin is a naturally occurring substance in woody plants. About one-quarter of dry wood is lignin, making it the second most prominent component of the wood part of a tree, with cellulose being the principal component. In the pulp mill process, cellulose is separated from lignin and recovered for use in a variety of different products.

Lignosulfonate, a lignin product recovered from the sulfite pulping process, is of special interest in considering environmental issues. It has been used as a treatment for dirt roads in Europe and North America since the 1920's. Extensive scientific research and the historical use of this product without reported complaints of plant damage or serious problems support the conclusion that lignosulfonates are environmentally friendly and non-toxic.

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A 1960's study at Industrial Bio-Test Laboratories to determine subacute and chronic toxicity from lignosulfonate noted no abnormalities in blood studies, urinalysis, food consumption, behavior or autopsies of treated laboratory rats. Studies at the WARF Institute in 1976 on sodium lignosulfonate again showed that product to be non-toxic in acute oral toxicity studies using white rats. In a 1986 study published in the *International Journal of Environmental Studies*, vegetation and growth of fir trees were not significantly affected at normal and above normal application rates of lignosulfonates. Toxic levels of lignosulfonates in surface water have been established, and confirm that concentrations must be relatively high before fish and other organisms are affected.

A series of toxicological tests using laboratory animals were performed more recently (1988-1990) on lignosulfonates at Stanford Research Institute International in California. Careful analysis of the data confirmed earlier conclusions. Lignosulfonates were found to be essentially non-toxic and not irritating, not mutagenic or genotoxic, and safely used in animal and human food contact products.

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Lignosulfonates have been approved for use in animal feed, various food contact materials and pesticide formulations by the U.S. Food and Drug Administration, the regulatory agency charged with ensuring the safety of the food supply. Lignosulfonates have been used for nearly 40 years in animal feed. No chronic toxicity problems have been recorded to date, either from applications involving human food contact or animal consumption.

Last year, lignin manufacturers formed the Lignin Institute to promote the quality and safe use of lignins. LI members are developing voluntary quality standards for lignin products used on road surfaces and in animal feedstock. The standards will identify important quality assurance considerations and guidelines for determining appropriate amounts of components in lignin products.

Guidelines for the proper application of lignin products to road surfaces are being outlined, which include instruction to applicators to give prudent consideration to weather, soil and surface water conditions. The importance of transporting finished products in clean vehicles and using clean equipment free of foreign residues is emphasized.

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