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Solidification/Stabilization of Lead with the Aid of Bagasse as an Additive to Portland Cement

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Presentation format: Poster (Reference # 2)

Solidification/stabilization of hazardous wastes is a widely used technology; therefore, it is very crucial to be able to evaluate its effectiveness and to make attempts to improve the technique. The primary objective of this project is to design a better matrix for S/S of hazardous waste that will be effective and economically feasible by adding an adsorbent additive to the waste/cement matrix. The waste will be stabilized by complexing with the large molecule preventing the waste from leaching. The adsorbent to be used is lignin, but to make the process more economically feasible, the source of lignin will come from the large excess of bagasse (byproduct of milling or diffusing sugar cane ~ 1.8 million tons annually in Louisiana) produced each year from sugar cane processors. One of the components of bagasse is lignin, approximately 22% by weight. This excess bagasse will be used as an adsorbent additive to the cement in an effort to develop a better matrix to entrain heavy metal waste.

Preliminary results indicate that using bagasse as an additive to cement could be effectively improving the S/S of metal wastes. Lead nitrate was used as model heavy metal wastes with a metal to cement ratio of 1:10. Samples were analyzed by following the Environmental Protection Agency recommended Toxicity Characteristic Leaching Procedure and determining metal leaching concentrations by Atomic Absorption. Samples containing bagasse typically leached less than 0.5 mg/l of lead, while samples containing no bagasse leached approximately 7 mg/l of lead. Results indicate that using bagasse as an additive to cement is effectively improving the S/S of lead metal wastes.