

**Leach J.M., and L.T.K. Chung. "Development of a Chemical Toxicity Assay for Pulp Mill Effluents." Industrial Environmental Research: United States Environmental Protection Agency: February 1981. (Reviewed by Lucy Cho)**

This piece is a summary of a project done by the Environmental Protection Agency's Industrial Environmental Research Laboratory. Its focus is on the toxicity of the pulp mill effluents, and out of approximately 30 known toxic organic compounds emitted from pulp mills, about 20 of them were analyzed in this study.

It was done in two phases, which involved: 1) designing an analytical procedure to predict effluent toxicity, and making an evaluation of that procedure, and 2) using the procedure to estimate toxicant loadings. The goals of phase I included making a procedure that allows for rapid measurements of concentrations of toxic substances extracted from bleached and unbleached kraft whole mill, groundwood and sulfite mill effluents, and comparing the chemical toxicity assays of the effluent to bioassays done in rainbow trout. Then in phase II, one of their goals included assessing the effectiveness of mill biotreatment systems for reducing toxic loadings in mill effluents.

From 26 different mills, they collected both primary- and secondary-treated bleached and unbleached softwood kraft and sulfite. Some of the samples were taken from mills along the Willamette River, but many others were collected from the British Columbia, the Midwest of the USA, East Coast, Ontario, Maritimes Canada, N. Carolina, western Canada and Washington. In their chemical assays of the effluents and bioassays of the fish tissue, they found some inconsistencies. Approximately 10% of the samples had high toxicities according to the chemical assays, whereas the bioassays showed low toxicity.

## **Critique**

Much of this study was very similar to other chemical toxicity assays, but what made this particular project unique was that it was not limited to a specific region such as the Willamette River basin. It covered various areas across the U.S. and in Canada. This may have made the study somewhat broad and difficult to study in-depth. For example, the inconsistencies in their data were hard to explain perhaps because there was little connection or relation between the sites. It merely stated that 10% of the paper mill sites showed inconsistencies between the chemical assays and bioassays. In an attempt to see the big picture, this project may have spread itself too thin. The broadness of this study led to a very surface level analysis of their data. For instance, this made it even more difficult to come up with explanations for the observed inconsistencies. Instead they made recommendations or suggestions for future studies to investigate the lack of agreement in their data. Some of these included testing different types of fish such as warm water fish species because these would be more relevant to studies done in the south. Although their recommendations gave some insight into the causes of this inconsistency in their data, there was little or no evidence to suggest that they really applied to this specific situation.

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