

**Evidence that Dibenzofuran Acts as a Precursor for the
Chlorinated Dibenzofurans Formed During Pulp Bleaching**

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ABSTRACT

Low levels of chlorinated dioxins and furans (collectively referred to as dioxins) have recently been discovered in the waste streams and products of certain bleached kraft pulp mills. Paprican has responded by initiating a research program to determine how and under what conditions dioxins are formed in pulp and paper processes with a view to minimizing or eliminating their formation.

Preliminary findings from this investigative research program have identified oil-based defoamers as a potential source of unchlorinated furan and dioxin precursor compounds which can be converted to their chlorinated forms in the chlorination stage of pulp bleaching. As a follow up to these initial findings, some additional selected defoamers and defoamer base oils have been examined for their dibenzofuran (DBF) content and for their capacity to contribute to chlorinated dioxins/furans formation when added to brown stock pulp prior to bleaching. From these more recent studies it is clear that significant differences exist between the various types of oils used by defoamer compounders. Certain types of oils appear to be free of dibenzofuran precursor; these are premium oils which have been specially treated to eliminate aromatic constituents. The absence of dioxin/furan precursors in this grade of oil was confirmed by the observation that chlorination of brown stock pulp spiked with a defoamer based upon such oil did not lead to an enhancement of chlorinated dioxins and furans.

This paper will also include a general discussion on the various mechanisms whereby chlorinated dioxins and furans can be formed in pulp bleaching and the role that precursor compounds such as the unchlorinated dibenzofuran (DBF) play in such a process.