

## **Oral Bioavailability of Polychlorinated Dibenzop-Dioxins/Dibenzofurans in Industrial Soils**

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**ABSTRACT** In this study, the oral bioavailabilities of numerous 2,3,7,8-PCDD/F congeners were evaluated in soil samples from an industrial site. The purpose of this study is several-fold: (1) to compare the soil bioavailability results of the different PCDD/F congeners; (2) to evaluate the consistency of the bioavailability results with those obtained in an in vitro bioaccessibility study with simulated GI tract fluids; and (3) to develop quantitative bioavailability measurements that are appropriate for use in a health risk assessment for this site. Soil samples containing PCDD/F toxic equivalent (TEQ) concentrations ranging from 0.53–45.2 ng/g were administered to female Sprague Dawley rats via oral gavage. Reference formulations of PCDD/Fs were administered intravenously or by oral gavage. The overall relative bioavailability of PCDD/Fs in the soil samples on a TEQ basis ranged from 17 to 51%, with a mean of 38%. The results of the in vitro bioaccessibility study were consistent with the bioavailability results (mean extracted TEQ of 22%). Because of the clear relationship between increasing chlorination and decreasing bioavailability and bioaccessibility observed in this study, we suggest that simply extrapolating results from one congener to another may be associated with a high degree of uncertainty.

**Key Words:** dioxin, TEQ, soil contaminant, PCDD/F bioavailability, bioaccessibility.

Received 30 July 2008; revised manuscript accepted 22 February 2009.

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