

Mechanisms of Microbial Tolerance to Xenobiotics. (S09-drijber153553-Oral)

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Abstract:

A successful remediation strategy employs chemical and/or biological processes to reduce contaminant concentrations in the environment to levels deemed safe for public health. A prerequisite for contaminant degradation is tolerance to the chemical(s) in question. This applies equally to those microbes directly responsible for degradation and to those essential to maintain or restore soil function. Because soils are largely inhospitable, many microorganisms have evolved various 'stress responses' to allow prolonged survival under conditions unfavorable to growth. Inducers include starvation, desiccation, toxic chemicals, and extremes in pH, temperature and osmolarity. Physiological responses include reduction in cell size, cytoplasmic inclusions, changes in intracellular pH, and modification of membrane lipid composition. Tolerance to toxic chemicals may also be achieved through altered cell surface properties, induction of contaminant efflux systems and detoxification pathways, and habitat modification thereby reducing contaminant bioavailability. This paper will explore several of these mechanisms as they pertain to microbial tolerance to hydrocarbons.

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