Characterization of atrazine-degrading bacteria capable of accessing soil-sorbed atrazine. (S03-feng163448-Poster)

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Abstract:

Bioavailability of soil-sorbed atrazine is affected by the characteristics of both soils and atrazine-degrading bacteria. Although sorption and desorption of atrazine by soils have been studied extensively, little is known about the effects of the characteristics of atrazine-degrading bacteria on the bioavailability of soil-sorbed atrazine. In this study, we characterized three atrazine-degrading bacteria, Pseudomonas sp. strain ADP, Agrobacterium radiobacter strain J14a, and Ralstonia sp. strain M91-3, with respect to their ability to degrade sorbed atrazine. Strain ADP was able to access soil-sorbed atrazine in three of the five soils tested, whereas strains J14a and M91-3 degraded sorbed atrazine in two of the five soils. All three organisms were Gram-negative motile bacteria with at least one flagellum; none produced biosurfactants under normal culture conditions. Strain ADP had a higher chemotactic response than J14a whereas M91-3 did not show a significant chemotactic response. Attachment of ADP and J14a to an organic soil was significantly higher than attachment to four mineral soils. For M91-3, cell attachment to the organic soil

was higher than to three of the four mineral soils. Strain M91-3 was more hydrophobic than ADP and J14a based on attachment to hexadecane, while ADP exhibited a greater capacity to attach to polyvinyl chloride surface after 15-h incubation. Surface translocation of ADP was considerably faster than J14a or M91-3 on soft agar plates. Further research is needed before definitive conclusions can be made regarding the effects of bacterial characteristics on their ability to access sorbed atrazine.

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Presentation Information:

Presentation Date: Tuesday, November 12, 2002
Presentation Time: 9:00-11:00 am
Poster Board Number: 2115

Keywords:

bioavailability, atrazine, sorption