

REMOVAL OF TOXIC CONTAMINATES FROM POLLUTED SOIL AND WATER VIA BIOREMEDIATION UTILIZING BACILLUS SPORES

Atrazine, a widely used herbicide in North America, is one of the known pollutants that pose a potential threat to human health. The addition of naturally occurring degradative bacteria that can remediate these pollutants has been promising. The soil bacterium *Pseudomonas* sp. strain ADP produces the enzyme AtzA which modifies atrazine to the benign hydroatrazine. However, the current use of bacteria in bioremediation is limited. These bacteria need to compete for nutrients with the native populations of microorganisms in the contaminated soil to survive and to maintain a degradative population. Bacterial endospores are naturally resistant to harmful environments, such as acidic soil, heat, and dessication; and have the ability to persist in soil for long periods of time. We wanted to utilize the *Bacillus* spore as a vehicle to deliver degradative enzymes, such as AtzA, into the soil and allow the tethered enzymes to persist over time. We utilized two methods for the tethering of enzymes to the spore surface. The first method being a genetic fusion of degradative enzymes to the exosporium of *Bacillus* endospores, and the second method being a chemical linkage to the outer layers of the *Bacillus* exosporium.

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