IMMOBILIZATION OF HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE (RDX) BY PLANTS

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Abstract: The U.S. Environmental Protection Agency has indicated that explosives, particularly RDX, can be troublesome contaminants on military sites. As a result of incomplete combustion and detonation, RDX has documented at some military sites and has resulted in restriction of live-fire training activities. An issue of concern is the potential migration of RDX into surface water and groundwater. Because live-fire training is critical for the US Armed Forces, there is a need for inexpensive management technologies. This project investigated the transport and degradation of RDX in an unplanted and planted environment. Phytostabilization and rhizodegradation studies were conducted to address the concentrations of RDX in the soil. The study consisted of soil from a contaminated RDX site. Cyperus esculentus (Yellow Nutsedge), which is a grass-like species, was planted in the contaminated soil. Following plant maturity, a sixteen week rain assimilation procedure was performed to create runoff and leachate. Data obtained from the weekly samples concluded that RDX concentrations decreased in the leachate and increased in the runoff of the planted environment. Final analyses showed that there were no measurable amounts of RDX detected in the plant tissues or soil. As for degradation, biological tests showed a higher removal percentage of RDX in that of a rhizosphere soil compared to the unplanted. Yellow nutsedge shows potential to be effective in the immobilization of RDX on military firing sites.

Keywords: RDX, immobilization, phytostabilization, rhizodegradation, and Cyperus esculentus

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