



*University of Utah*

UNDERGRADUATE RESEARCH JOURNAL

## **IMPROVING SUSTAINABLE INDUSTRIAL WASTEWATER TREATMENT**

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### ABSTRACT

Innovations in sustainable industrial wastewater treatment are needed to improve the cost effectiveness of treatment while protecting environmental resources. The US military is currently utilizing insensitive high explosives (IHEs) containing 1,2,3-triazol-3-one (NTO) to replace conventional and less safe munitions such as TNT and RDX. In the process of creating IHEs, munition manufacturers, load and pack facilities, and demilitarization facilities generate wastewater streams that contain concentrations of IHEs. Currently, facilities handling IHE munitions lack a cost effective and sustainable system for treating industrial wastewater containing these compounds. Ion exchange (IX) resins were investigated for their ability to remove NTO. Further, brine regeneration of the resins was investigated to increase the sustainability and cost effectiveness of the treatment system. The objective of this study was to (1) determine the potential for an anion exchange resins selective for nitrate and perchlorate to retain NTO and (2) evaluate brine recharge of anion exchange resin. Results indicated that NTO was exchanged with chloride on the resins at up to 28-78% of the theoretical exchange capacity. In 30% brine washing solution, between 73 and 100% of the NTO was removed from the resins. These results provide insight into alternative industrial wastewater treatment technologies that could be used in munition manufacturing facilities.