

Manufacturing Technology for Decontamination Enzymes

PROBLEM / OBJECTIVE

The purpose of this project was to establish the technology and processes needed for production of a nontoxic, non-corrosive, and environmentally safe catalytic enzyme that can be used to decontaminate chemical nerve agents. The current decontaminant, DS2, is highly toxic and corrosive, which makes it hazardous for use by personnel, on equipment, and for the environment. It also is a logistical burden due to the weight and volume of the product and packaging.

ACCOMPLISHMENTS / PAYOFF

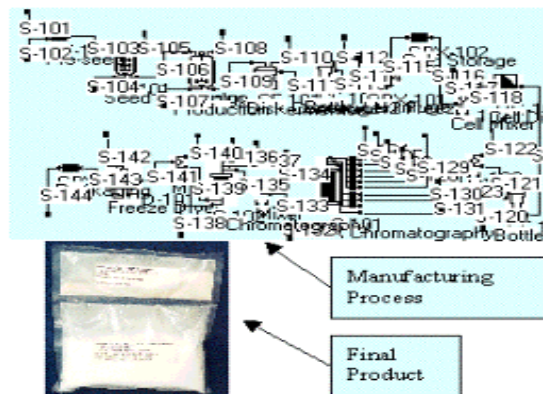
Process Improvement:

The enzyme organo-phosphorus acid anhydrolase, OPAA, from a genetically altered *E. coli* bacterium was found to effectively decontaminate G-type nerve agents and is stable, nontoxic and environmentally safe. OPAA is packaged as a dry powder with a dry buffer packet that significantly reduces the logistical burden over DS2 packaging.

Implementation: and Technology Transfer:

The enzyme is of much interest to industry. Pre-production quantities were given to Altus Biologics, Inc. to test in their applications. A.D. Little has interest in the production in excess of 42 kilograms of the enzyme in their application.

The Joint Service Superior Decon System (JSSDS) is scheduled for production in FY08. Enzyme-based decontamination technology will also be evaluated in the Joint Service Fixed Site Decon (JSFSD) program to replace DS2. NATO Project Group 31 has a mission to develop enzyme-based decontamination material in a similar timeframe as JSSDS. In



addition, other commercial applications include foams for use by fire departments and hazard material teams, and agricultural pesticide use.

Expected Benefits:

Large-scale production of a ten-enzyme-based chemical agent decontaminant to replace the current DS2 will result in \$3.4M cost avoidance. Storage cost for decontamination enzymes are estimated at 1% of the current DS2 storage cost. No hazardous material shipping and disposal costs are required for the enzyme-based system. In general, the enzyme-based system is a safer, non-corrosive, environmentally friendly, and logistically manageable decontaminant than DS2

TIME LINE / MILESTONE

Start Date: October 1996
End Date: September 1999

FUNDING

Army ManTech investment: \$515K

PARTICIPANTS

SBCCOM Molecular Engineering Team
SBCCOM Environmental Technology Team
GEO-CENTERS, Incorporated
EAI Corporation