



# Biodegradable Detergents

## What It Is:

Oil and grease can collect on the military equipment stored at Army depots. To clean these supplies, we're producing degreasers and detergents made from renewable, biodegradable resources.

## Why It's Needed:

Many degreasers now used by the Army are made from petroleum-based chemicals-like chlorinated hydrocarbons-that have a negative impact on the environment. In support of a congressional mandate called the Environmental Quality Program, we're developing aqueous-based degreasers and detergents.

## How It Works:

We're focusing on a degreaser chemical known as emulsan. Emulsan disperses oil and grease into water, creating an "emulsion" that can be either recycled to recover the oil or washed away and treated biologically.

Currently we're addressing these questions:

- What metabolic pathways are involved in synthesizing emulsan?
- Can we develop "hyperproducing" mutant strains of this degreaser?
- How does emulsan affect the biodegradation of hydrocarbons?

Emulsan's structure can be bioengineered by manipulating the side chains attached to its backbone (see *diagram*). That lets us predict and control how the emulsifier interacts with specific hydrocarbons.

## Benefits:

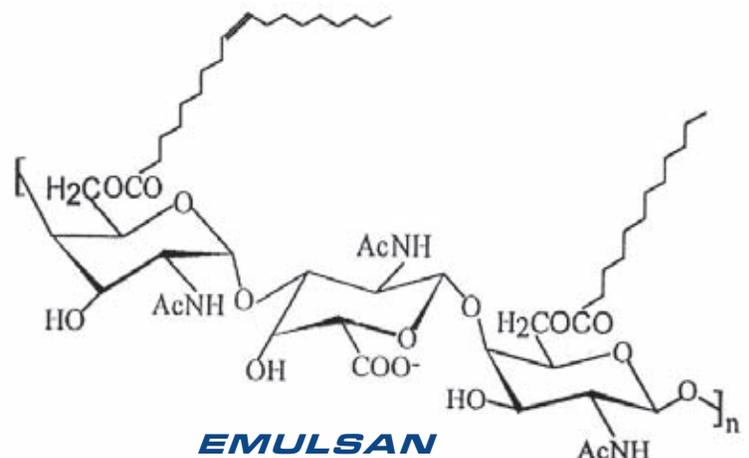
**Environmentally Sound...** Although synthetic detergents are currently less expensive, our water-based products eliminate the need for hazardous solvents.

## Point of Contact:

**Supporting Science & Technology Liaison**

COMM (508) 233-4478, DSN 256-4478

E-MAIL [amssb-rss@natick.army.mil](mailto:amssb-rss@natick.army.mil)



**NATICK  
SOLDIER  
CENTER**

Kansas St.  
Natick, MA  
01760  
[nsc.natick.army.mil](http://nsc.natick.army.mil)

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