Microbial Degradation of Explosives in a Bioreactor

- a research project

Dr. Monica Odlare

MÄLARDALEN UNIVERSITY

BIOREX

- Biological Remediation of Explosives

MÄLARDALEN UNIVERSITY

MÄLARDALEN UNIVERSITY

Research at the Department of Public Technology

- Energy Management & Load Control
- Process & Sensor Development
- Process Efficiency Improvement
- Sustainable Management & Communication

MÄLARDALEN UNIVERSITY

Objectives with BIOREX

- Develop a method for microbial degradation of explosives
- Remediate sludge and soil contaminated with explosives
- Characterization of the degradation process

MÄLARDALEN UNIVERSITY

Project partners

- Mälardalen University
- Nammo Demil Division
- Cesium Innovation Company
- Eurenco Bofors
- Bofors Test Center
- Swedish Defense Research Agency
- KCEM (Competence Centre for Energetic Material)

Explosives in Sweden

- Demilitarization
- Ammunition factories
- Explosives factories
- Testing sites
- Closed down military sites
- Mining industries

www.nammo.com


www.mil.se

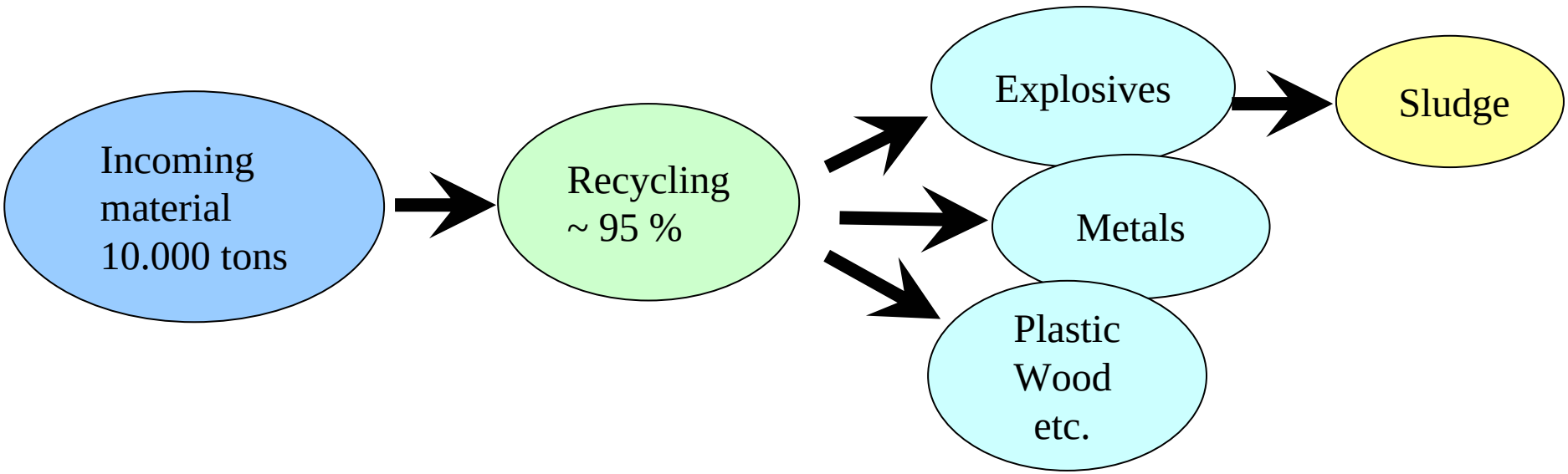
Explosives in Sweden

- Demilitarization
- Ammunition factories
- Explosives factories
- Testing sites
- Closed down military sites
- Mining industries

Contaminated
- Soil
- Water
- Waste (e.g. sludge)

MÄLARDALEN UNIVERSITY

Nammo Demil Division



TNT sludge

- 80% TNT
- Organic material
- Metals

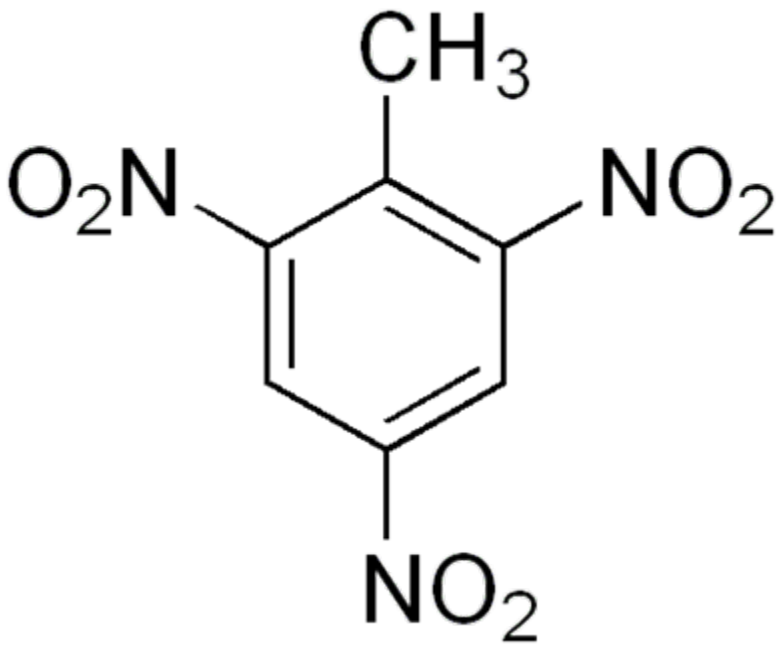
MÄLARDALEN UNIVERSITY

Explosives are toxic

- Microorganisms
- Plants
- Animals
- Humans

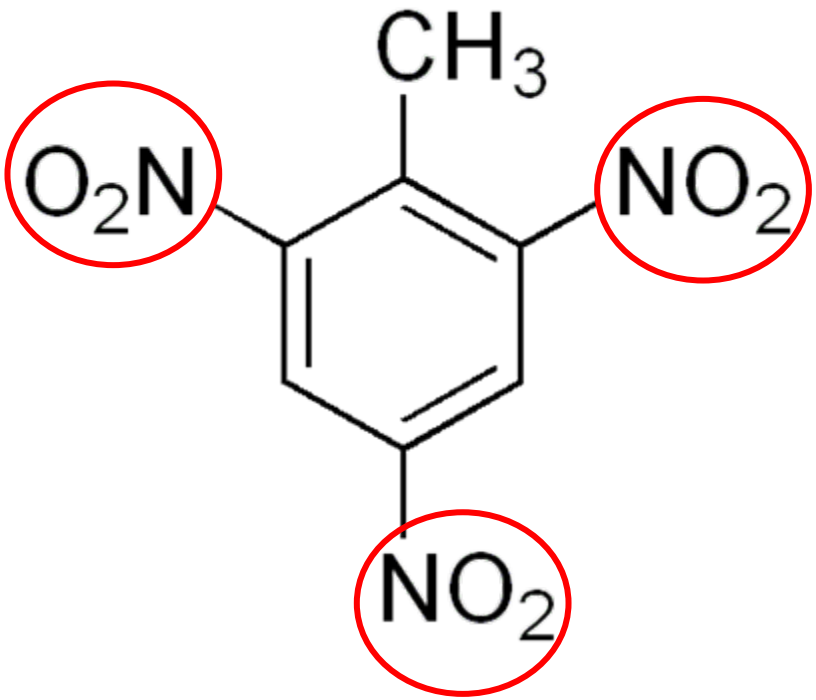
MÄLARDALEN UNIVERSITY

TNT (Trinitrotoluene)

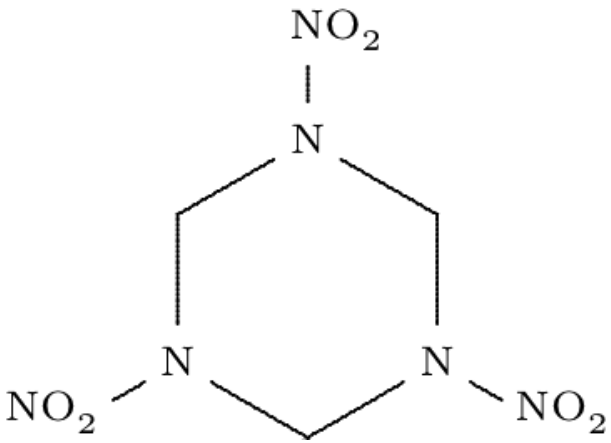


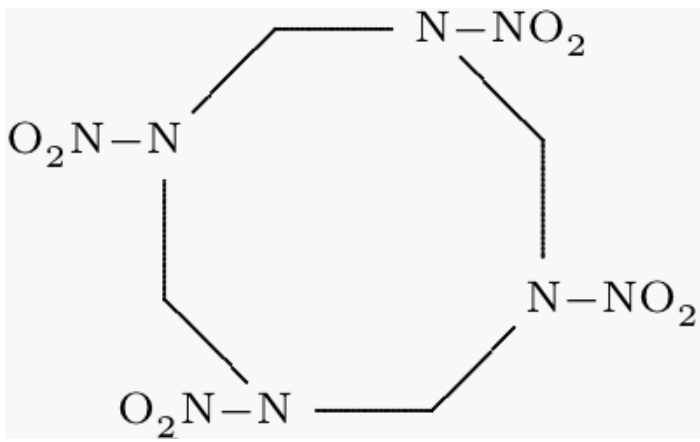
MÄLARDALEN UNIVERSITY

TNT (Trinitrotoluene)

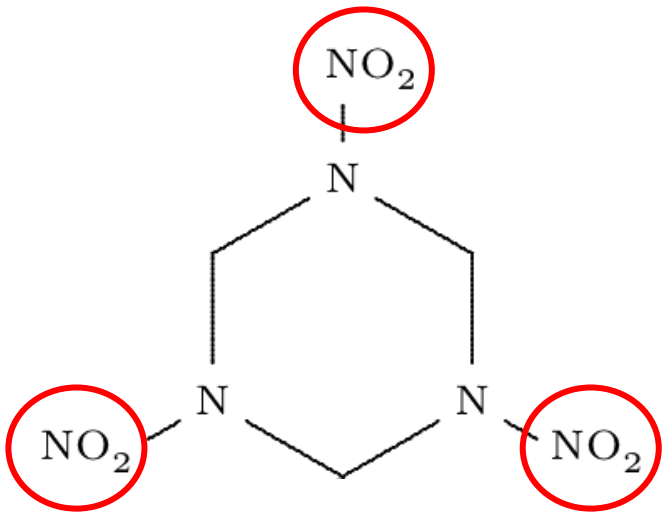


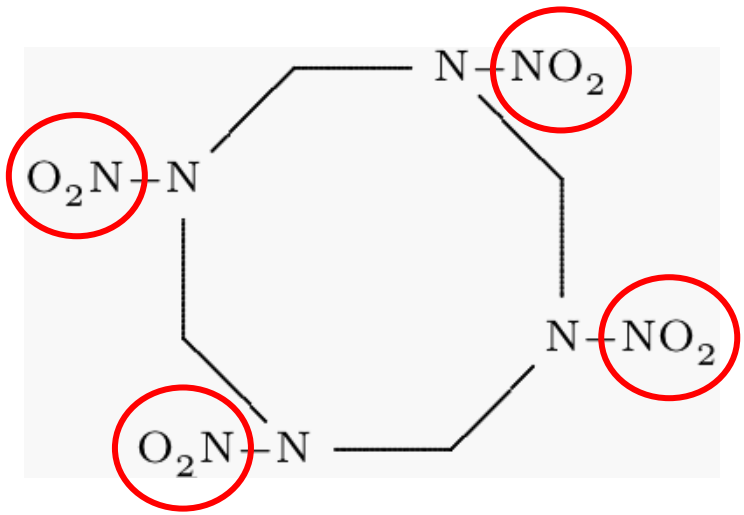
RDX and HMX





RDX and HMX

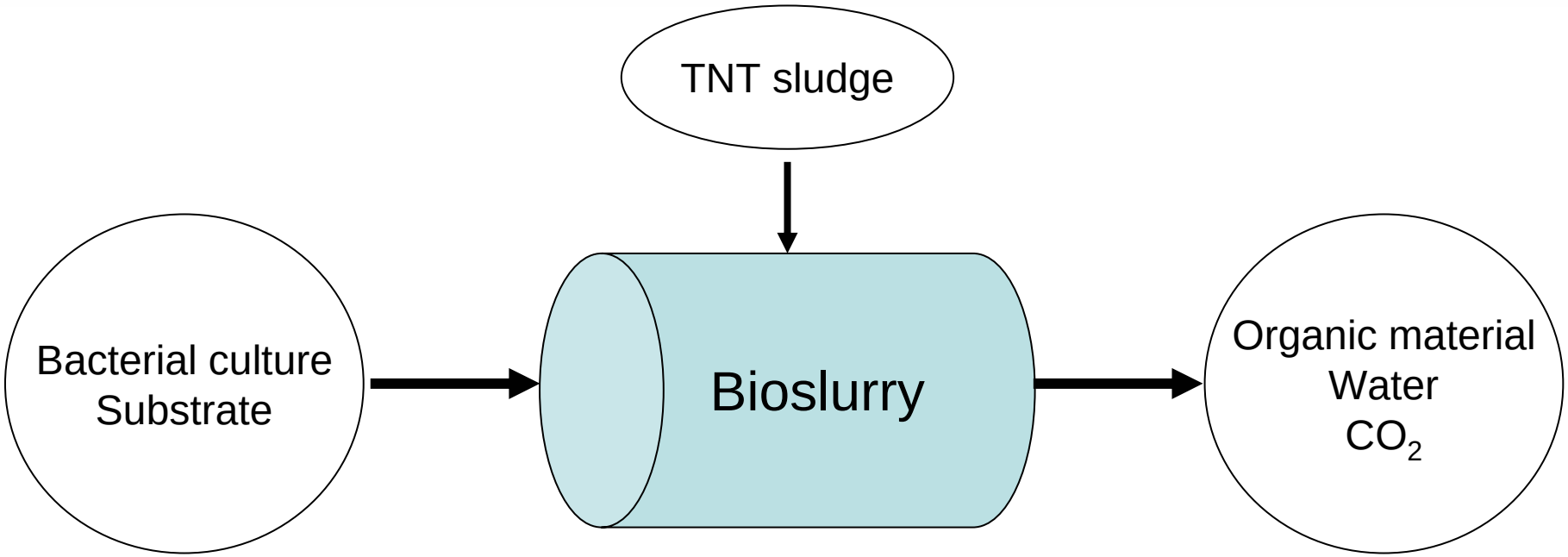




The large-scale bioreactor

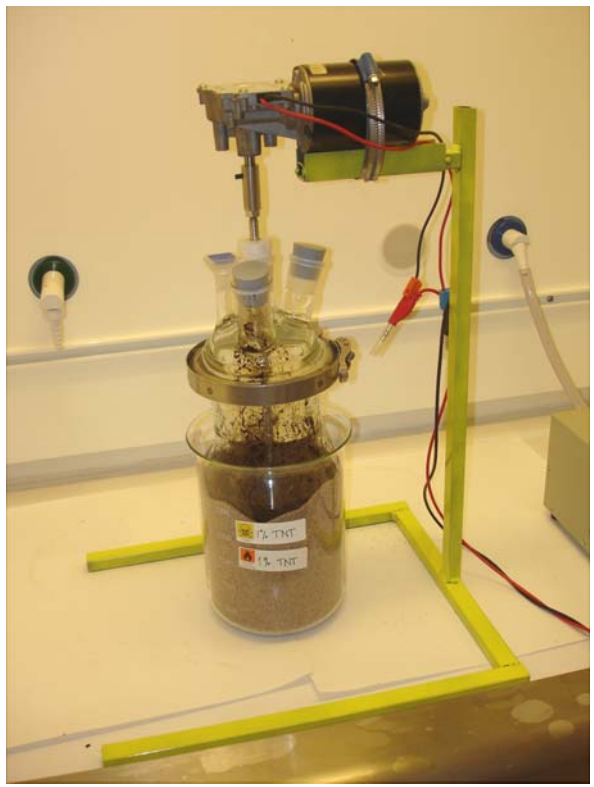
- Mobile
- On-site
- Cost-effective
- Simple to operate

Project idea



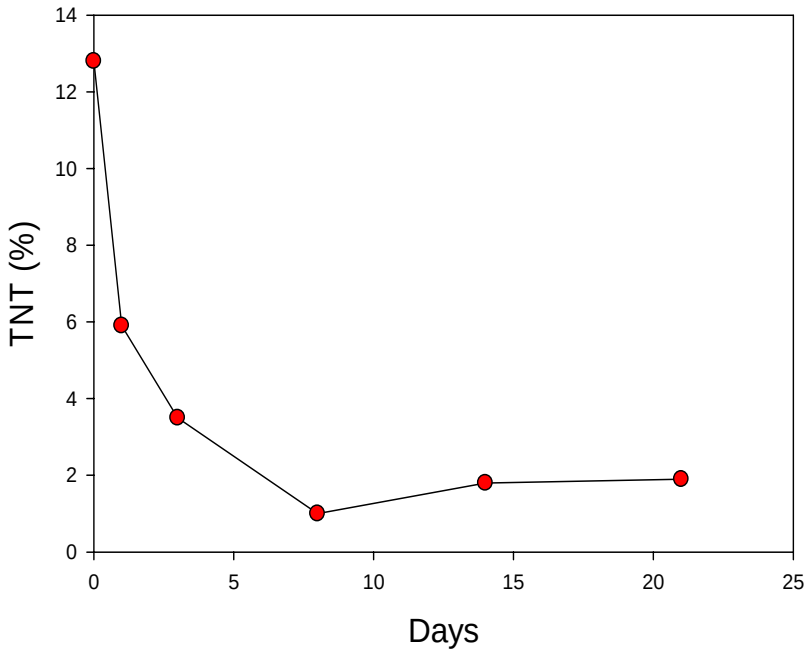
MÄLARDALEN UNIVERSITY

A laboratory bioreactor

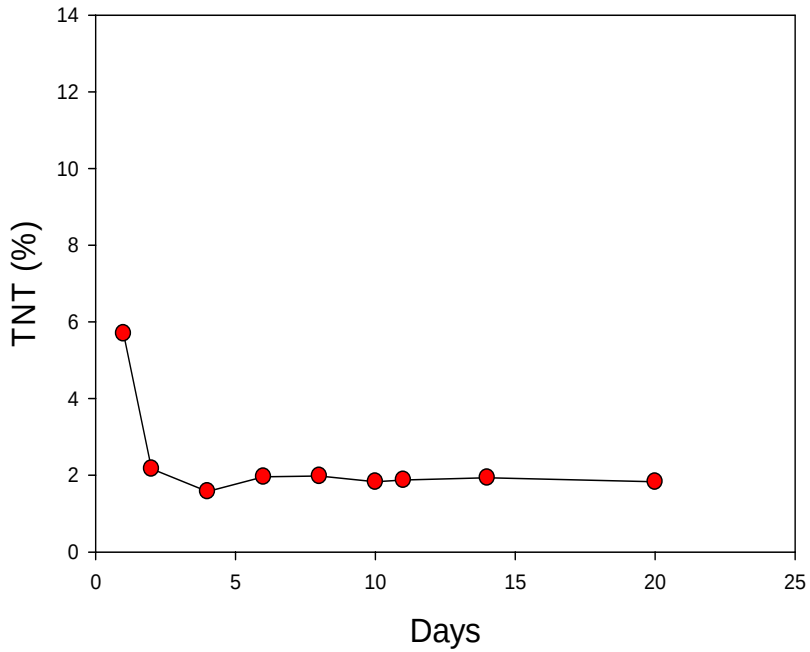


Promising results

Experiment 1



Experiment 2



MÄLARDALEN UNIVERSITY

Future plans

- Use the bioreactor for degradation of other pollutants (oil, petrol, creosote etc.)
- Using filter techniques for treatment of polluted water (explosives, metals etc.)

MÄLARDALENS HÖGSKOLA
ESKILSTUNA VÄSTERÅS

Contact information

Monica Odlare
monica.odlare@mdh.se
+46 21 101611