

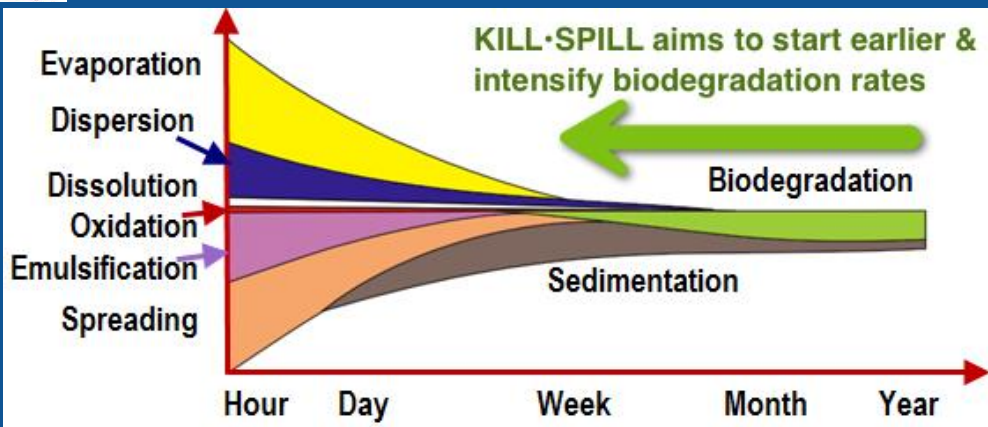


Integrated biotechnological solutions for combating marine oil spills

(11 countries, 33 partners; 12.5 M€ total, 9 M€ EU, 27.8% to SMEs; FP-7 / Ocean of Tomorrow / KBBE.2012.3.5-01); www.killspill.eu



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- + Develop solutions for **sediments**
- + Biodegradation **monitoring** tools
- + **Toxicological** assessment of KILL•SPILL products
- + **Field testing** & benchmarking of new products

This project is supported by the EU under the Food, Agriculture and Fisheries and Biotechnology theme of the 7th framework programme for Research and Technological Development under Grant Agreement no.

312139



→ KILL•SPILL has been developing 28 novel products ←

- * Biosensors / monitoring
- * Bio-based dispersants

- * Bioremediation agents
- * Sediment clean up



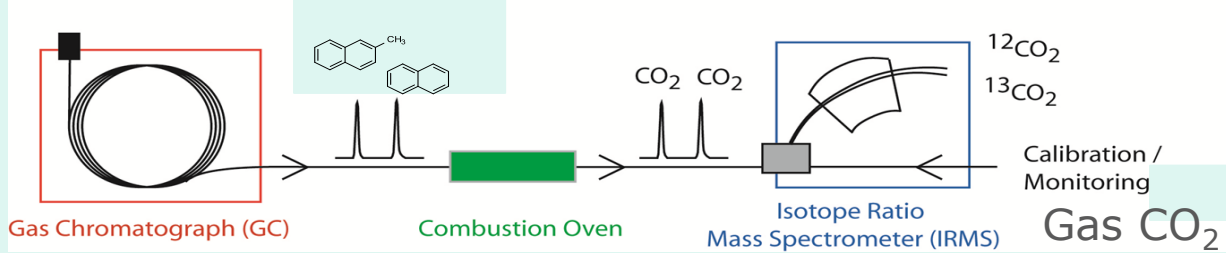
vermicon
solutions for microbiology



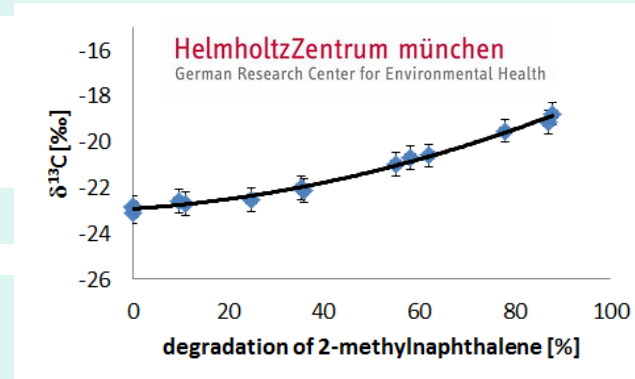
Green: *Alcanivorax borkumensis*, **Yellow:** *Oleispira antarctica*; Total magnification **1000 x**

FISH protocols adapted to easy and standardized VIT® format allows fast and specific on-site monitoring. Test kits for several hydrocarbon degraders are commercially available.

Compound Specific Isotope Analysis



Biodegradation is associated with an enrichment of ^{13}C in the remaining contaminant pool → increasing $\delta^{13}C$



Strain	Biosurfactants (main congener)	Yield (g/L)
<i>Pseudomonas (aeruginosa PAO1)</i>	Rhamnolipids (Rha-Rha- C_{10} - C_{10})	2-3
<i>Burkholderia (Thailandensis E264)</i>	Rhamnolipids (Rha-Rha- C_{14} - C_{14})	2-4
<i>Candida bombicola</i>	Sophorolipids	20-100



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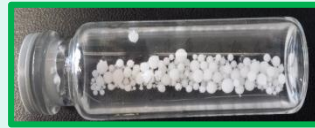
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- * Bio-based dispersants



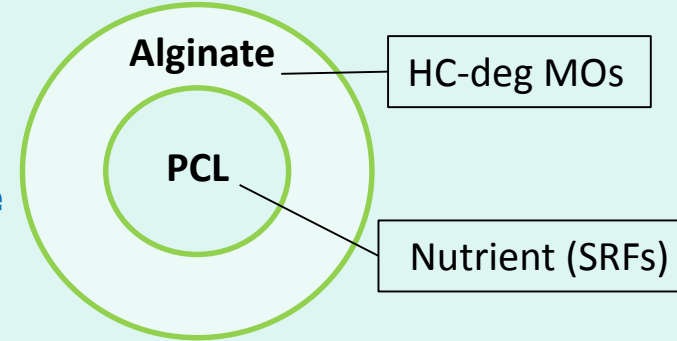
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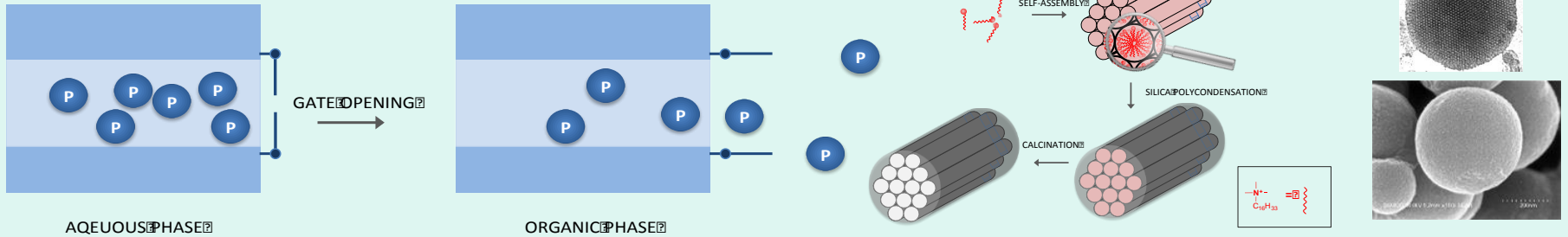
Slow-release microparticles immobilized with HC-degraders and slow release biosurfactants, fertilizers, enzymes and e-acceptors.



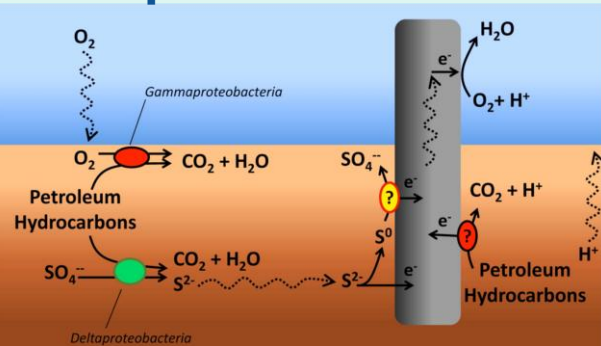
Polycaprolactone (PCL) COREs



Development of a "smart gate" system allowing the release of nutrients in the contact of an organic phase



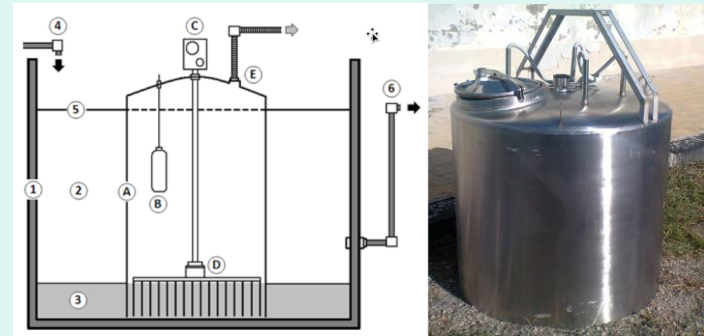
Kill•Spill Snorkel



A novel bio-electrochemical approach to accelerate in situ the degradation of petroleum hydrocarbons in anoxic marine sediments



Kill•Spill Sediment Cleaner



→ KILL•SPILL commercialization, industrial applications ←

- * Biosensors /monitoring
- * Bio-based dispersants



- * Bioremediation agents
- * Sediment clean up

Marine Oil Spills – the business of clean up:

- ◆ The “emergency response industry” is changing and shrinking as the annual number of “oil-tanker accidents” is consistently decreasing.
- ◆ New opportunities: Off shore & deep sea accidents
- ◆ More frequent business: Smaller size accidents (shipping; not oil tankers)
- ◆ KILL•SPILL products need to be adopted by Emergency Response Companies
- ◆ KILL•SPILL products can be manufactured by “niche” SMEs or larger companies BUT must be adopted... (leverage of UKSPILL)
- ◆ KILL•SPILL products that could be adopted:
 - ✓ Non-woven fabric: Sorbent material for shore and near shore protection (HeiQ Materials AG).
 - ✓ FISH and Flow Cytometry kits (Vermicon)
 - ✓ Biosurfactants (ACTYGEA)
 - ✓ Mesoporous particles with smart gates
 - ✓ Low cost biostimulants
 - ✓ Sediment clean up technologies

