

KERO Bioprocess

Ref. case : Biotreatment of Kerosene Contaminated Soil

Laboratory study

A suspension of MADEP's aliphatic hydrocarbon degrading bacteria was added to 20 kg of the client's kerosene contaminated soil placed in a bioreactor. The temperature was set to 15°C.

Results

- Initial biodegradation rate: $<2 \text{ mg}/(\text{kg soil} * \text{day})$ or 2 ppm/day
(calculated from CO_2 measured in the bioreactor exhaust gas)
- Biodegradation rate after 3 days: $20 \text{ mg}/(\text{kg soil} * \text{day } 20)$ or 20 ppm/day
- Soil biomass increased more than 1000 fold in 3 days

The experiment was continued with nutrient addition and pH adjustment to optimize biodegradation. Following complete elimination of kerosene, additional kerosene was added to the bioreactor to bring the concentration to 2000 ppm.

Results

- Soil biomass remained at high levels
- Average biodegradation rate during 8 days: $66 \text{ mg kerosene}/(\text{kg soil} * \text{day})$ or 66 ppm/day

Full-scale treatment

At the client's site, 400 m³ of kerosene contaminated soil were conditioned with inorganic nutrients, inoculated with cultures of live bacteria supplied by MADEP and mixed.

Results

Treatment duration	Kerosene concentration (ppm)
Start	4000 - 8000
after 1 month	2000 - 3000
after 3 months	200 - 300
after 4 months	< 150

Kerosene removal rate: between 42 and 86 ppm/day

