

# COMBINATION OF STIMULATED AEROBIC BIODEGRADATION AND CHEMICAL OXIDATION IN ORDER TO DECREASING OF JET FUEL CONTAMINATION IN SOIL, COLUMNS TESTS

KOMBINACE STIMULOVANÉ AEROBNÍ BIODEGRADACE A CHEMICKÉ OXIDACE PRO SNÍŽENÍ OBSAHU LETECKÉHO PETROLEJE V KONTAMINOVANÉ ZEMINĚ - KOLONOVÉ TESTY

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## **Abstract:**

The aim of the column tests was a) to compare biodegradation in fully saturated and partly saturated zones, b) to find out the immediate efficiency of chemical oxidation by persulfate activated by Fenton's reagent and chemical oxidation by hydrogen peroxide only, c) to investigate stimulated biodegradation including bioaugmentation and d) to monitor bacterial density in each column. Four columns with 50 kg of Jet Fuel contaminated soil per each were used for the test. Duration of test was 42 weeks. Initial TPH contamination in soil ranged between 12 500-14 500 mg/kg dw.

Final efficiency in specific columns was:

- Column F1 (intensive oxidation by 15 % hydrogen peroxide, neutralization, bioaugmentation, nutrient addition, aeration): 84 %
- Column B1 (intensive oxidation by persulfate activated with Fenton's reagent, neutralization, bioaugmentation, nutrient addition, aeration): 76 %
- Column F2 (biodegradation stimulated by changing conditions of fully saturated and partly saturated zones, nutrient addition): 80 %
- Column B2 (biodegradation, light oxidation by hydrogen peroxide, nutrient addition, aeration): 68 %

The columns test results showed that autochthonic microflora on the site is able to withstand the stress conditions caused by intensive oxidation and after necessary pH value optimization accelerated biodegradation of TPH. . The application of diluted hydrogen peroxide to accelerate biodegradation of Jet Fuel contamination was recommended for the field test on site.

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## **Keywords:**

Jet Fuel contamination, column tests, stimulated biodegradation, chemical oxidation, Fenton's reagent