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June 15-16, 2015 Bangkok (Thailand)

Editors:

Prof. Dr. Akos Lakatos
Prof. Dr. Thaweesak Yingthawornsuk

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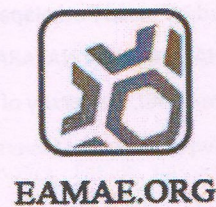
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A Battery of Toxicity Tests to Assess the Contaminated Soils in Kazakhstan

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Abstract. *The Republic of Kazakhstan is a major oil-producing and exporting country in Central Asia. In the process of production, transportation and refining, oil pollutes the environment, where particularly suffer the soil cover and aquatic ecosystem. One of the relevant issues of this problem is the development of technologies for monitoring and bioremediation of contaminated soils with oil and oil products. The aim of this pilot study was to assess toxicity of oil-contaminated soil samples by using a battery of toxicity tests based on microbes (Pseudomonas putida and other microbial species growth inhibition test). The reaction of Pseudomonas putida and various heterotrophic bacteria to toxic compounds characterized by a negative impact, especially on cell proliferation. To determine the effect of oil and oil products on the growth of these bacteria, several generations were incubated under different concentrations of oil. During incubation period, it was observed the inhibited and retarded concentrations on growth of the cultures for 16 hours, as during this time interruption of growth in the test solution is considered intoxication. An experiment was conducted for comparison the character of bacterial growth under liquid synthetic medium with bacteria species; where different concentrations of oil were added. The effect of oil on bacteria growth was tested by adding to the culture medium 0,5 % oil, which was accompanied by cell growth. Since oil concentration of 0,5 % showed a growth impairment for 16 hours and the optical density did not change. At the concentration of 1% the cell growth was inhibited and the optical density fell from 0.9 to 0.7, increasing the concentration of oil in the other samples resulted in suppression of cell growth. In this regard, the selection of test systems based on biological test objects quickly and efficiently assesses the toxicity of the soil. In addition, the test system not only evaluates the toxicity of the soil, but also can be used for monitoring of the process of bioremediation.*

Keywords: toxicity test, oil-contaminated soil, Pseudomonas putida, growth inhibition