عنوان مقاله:

The effect of organic chelates and gibberellic acid on petroleum hydrocarbons degradation in the soil co-contaminated with Ni and crude oil under canola cultivation

محل انتشار:

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خلاصه مقاله:

Background: Soil remediation is one the important problem in environmental studies. Thus, this research was conducted to evaluate the effect of organic chelates and gibberellic acid (GA3) on the degradation of crude oil in the soil co-contaminated with Ni and crude oil under canola cultivation. Methods: For treatments, HEDTA and NTA chelates at rates of 0 and 2.5 mmol/kg soil and foliar GA3 (0 (GA3(-) and 0.05 (GA3(+) mM) were used. In addition, the soil was polluted with Ni (0 and 100 mg Ni/kg soil) and crude oil at rates of 0, 2, and 4% (W/W). The plant used in this experiment was canola. The concentration of Ni in soil and plant was measured using atomic absorption spectroscopy (AAS). The concentration of total petroleum hydrocarbon (TPH) was measured using GC-mass. The mean differences were calculated according to the least significant difference (LSD) test. Results: The greatest degradation of crude oil belonged to the non-Ni-polluted soil under cultivation of GA3-treated plant, while the lowest one was observed in the soil received the greatest level of HEDTA and NTA chelates. Applying 0.05 mM GA3 foliar significantly increased the degradation of crude oil in soil and Ni in plant shoot by 12.1 and 8.3%, respectively. In addition, soil microbial respiration was also increased by 11.3%. Conclusion: HEDTA, NTA, and GA3 had a significant effect on the Ni phytoremediation efficiency and degradation of crude oil in soil that is a positive point in environmental pollution. However, the role of soil physico-chemical properties on the phytoremediation efficiency cannot be ignored.

کلمات کلیدی:

Soil pollutants, Biodegradation, Environmental, Petroleum