



## Assessment of soil pollution by toxic metals and petrochemical compounds in western Libya

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### ABSTRACT

The current study aims to assess soil contamination by toxic metals including titanium (Ti), beryllium (Be), tungsten (W), phosphorus (P) and vanadium (V) as well as other heavy metals. The soil samples were collected from Abu-Kammash in Libya which were exposed to petrochemical wastewater generated from the General Company of Chemical Industries (GCCl). The presence of hazardous materials was determined using inductively coupled plasma (ICP-Mass) spectrometry and gas chromatography-mass spectrometry (GC-MS). The results revealed that the soil samples obtained from 100 m of west and east Abu-Kammash were polluted with Ti (39 vs. 175  $\mu\text{g kg}^{-1}$ ), Be (219 vs. 421  $\mu\text{g kg}^{-1}$ ), W (0.015 vs. 0.041  $\mu\text{g kg}^{-1}$ ) and V (18.5 vs. 21.3  $\mu\text{g kg}^{-1}$ ). The concentration of heavy metal ions ranged from 18.5  $\mu\text{g kg}^{-1}$  of vanadium (V) to 1120  $\mu\text{g kg}^{-1}$  of zinc (Zn). Among the petrochemical compounds determined in this study, tetricontane ( $\text{C}_{31}\text{H}_{64}$ ), 3-methyl-2-oxopropylfuran ( $\text{C}_8\text{H}_{10}\text{O}_2$ ) and tetrapentacontane ( $\text{C}_{54}\text{H}_{108}\text{Br}_2$ ) were the most frequently detected elements in the soil samples. The presence of these toxic elements in the environment could pose adverse effects on human health since they might be accumulated in plant tissue and later transmitted to humans via the food chain.

*Keywords:* Toxic elements; Soil; Petrochemical compounds; Abu-Kammash; GC-MS; ICP-mass

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