Assessment of heavy metals contamination levels in surfaces soil in Baqa'a area, Jordan

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Abstract :

This study is focused to assest the heavy metals contamination levels in surface soil of Baqa'a area. Physicochemical tests have been carried out on thirteen samples from different localeties based on granulometric analysis (particle-size distribution), moisture content, pH, electrical conductivity (EC), total dissolved solids (TDS), Inductively coupled plasma (ICP) and X-Ray diffraction (XRD). Soil contamination was assessed using three indices including an index of geoaccumulation (Igeo), contamination factor (CF) and degree of contamination (Cdeg). Regarding the granulometric analysis result, it can be noticed that most of the soil can be considered as sandy loam. The current study showed a moisture content of the study soil ranges from 16.2 to 18.3%, whereas the pH varies from 7.40 to 8.90. XRD results indicated that the major existing mineral is quartz, while calcite, dolomite and kaolin are minor minerals.The results of ICP showed that the soil contamination assessment allows for the arrangement of the metals from the higher to lower mean content as follows: Mn > Cr > V >Ni > Zn > Cu > Co > Pb > Cd, compared to the average soil. The Igeo values indicated that the results reported uncontaminated soil (Igeo $\leq$ 0) for Cu, Pb, V and Cd, uncontaminated to moderately contaminated soil (0<1geo<1) for Co and Mn, Zn, Ni. The results of the CF index of heavy metals of the studied samples indicated low contamination to considerable contamination, whereas the value of

Cdeg for most of the heavy metals in the studied samples indicated a moderate to a considerable degree of contamination. Exception of this conclusion can be noticed for some sites as indicated in site BR9, which shows a high degree of contamination (Cdeg= 29.18). This site indicated also highly contaminated as approved by CF value. It can be concluded that most of reasons for high contamination in the study area are due to agricultural, industrial and dumping of waste materials that were observed in many localeties in Baqa'a area.