



## **Topsoil magnetic susceptibility and heavy metal contamination: a case study in al- Muthanna province, Iraq**

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Due to rapid urbanization and industrialization that has occurred in Al- Muthanna province south east of Iraq during the last decade, pollutants such as heavy metals have been emitted into the environment and become a serious threat to human health. Environmental pollution could be caused by different types of pollutants which comes from different sources.

This study aims to assess the environmental pollution caused by heavy metals using the magnetic susceptibility technique which becomes a rapid and cost effective compared to conventional methods. The study area is located in Al- Muthanna province, south east of Iraq, which contains three cement plants, oil refinery, bricks factories and power plants. Fifty topsoil samples (0-50 cm) depth were collected from five sites; Al- Jinoob cement factory (one site), Samawa oil refinery (two sites) and Al- Muthanna cement factory (two sites).

In this study I measured magnetic properties of samples in vertical sections and heavy metal contents (Cr, Ni, Cu, Zn, Pb, As) on selected samples and discussed the results between the different five sites. Magnetic results show the dominance of coarse magnetite, supposed to origin from anthropogenic activities. Mass specific magnetic susceptibility ( $\chi$ ) values are well correlated with Heavy metals (HM) contents.  $\chi$  and HM results indicate emissions from present industrial plants. Results demonstrate the suitability of applying magnetic methods to assess the environmental conditions.