IMPACT OF IRRIGATION WITH LOW QUALITY WATER ON TOXIC ELEMENTS CONTENT OF A SOIL-CROP SYSTEM AFFECTED BY INDUSTRIAL POLLUTION IN DELTA AREA

By

MAHMOUD MOHAMED AHMED EL-MALIH

B.Sc., Agric. (Technology of Project Management), Open System Ain Shams Univ. Sci. (2007)

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ABSTRACT

Two investigated drainage (El-Gabel El Asfar and Nikla) have been selected for study, according to the following consideration: surrounding heavily populated villages; its situation on the west side of the Nile near the intersection point between the Nile and its Delta and its closeness to highly industrial and agricultural activities. The aim of this study mainly concerned with the uptake of toxic elements (radioactive elements and heavy metals) by native plants grown naturally at polluted drainage, which is located at El-Gabel El-asfwr area and Nikla area.

The study deals with the usage of these plants in the detection of different elements (uranium and heavy elements). As well as the evaluation of the water used in the study area from heavy metals content for different life purpose. About 13 water samples from El-Gabel Asfer area and 8 samples from Nikla area have been taken from the water drainage at uniform intervals and from 5-7 m depth. The samples were analyzed and environmentally characterized through various important cations such as Ca, Na, K, Mg, U Th and heavy metal such as Co, Ni, Zr, Fe, Cu, V using flame photometer, spectrophotometric and atomic absorption techniques. The anions determined using either spectrophotometric or ion-chromatographic methods; they included bicarbonate, sulphate, chlorides.

This study focus on the evaluation of these water samples as potable according to international regulations Also Three plant species have collected from the study areas with their associated soil . Each species is collected in triplicate from the same point. The collected samples have been analyzed for their heavy metals and radioactive elements content as well as their associated soils.

The chemical composition of soil shows the dominance of SiO_2, Al_2O_3. MgO and CaO. While the prevailed trace elements are Sr (up to 307.6 ppm), Zr (up to 311.1 ppm), Cr (up to 266.4 ppm) and Ba (up to 457.1 ppm).

The uranium content of the soils ranges between 0.91 and 5.5 ppm declaring that the investigated areas are of low grade uranium area and the Th content of the soils ranges between 3.5 and 7.5 ppm. The radioactivity is attributed to the fertilizer.

21 water samples were taken along the drainage at Nekla and El-Gabel Asfar area. The chemical analysis for water samples shows salinity ranges between 910 and 960 ppm at Nekla and from 920 to 990 at El-Gabel Asfar area.

Keywords: Irrigation, Heavy metals, Waste Water, Soil, Castor bean, Woven, Water hyacinth

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Mahmoud Mohamed Ahmed El-Malih

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