Wastewater and sludge reuse in agriculture

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The reuse of Municipal wastewaters (TMWW) for irrigation of crops, and of sludge for the amendment of soils, is a multidimensional disposal practice aiming at: (i) minimizing the environmental problems by releasing the pressure exerted by these two inputs on the environment, (ii) providing the growing plants with water and nutrients and (ii) improving soil fertility and productivity,

The research work conducted in our University in relation to accomplishing a safe reuse has been focused on the study of the following aspects of reuse: (i) heavy metal accumulation in soils and plants with emphasis on their edible part. This aspect has been studied by conducting a series of experiments aiming at the study of the accumulation of heavy metals in soils, and in plant roots, stalks, leaves and fruits. The conclusions drawn so far with regard to the order of accumulation of heavy metals are: Roots>leaves>stalks>fruits (edible parts) (ii) interactions between heavy metals, plant nutrients and soil chemical and physical properties. After the examinations of hundreds of interactions, and the development of a quantification of the interactions contribution, it was found that considerable quantities of heavy metals and nutrients are contributed to the soil and to various plant parts , emphasizing the important role of the elemental interactions in plants.(iii) assessment of soil pollution with heavy metals based on pollution indices, Three pollution Indices have been established by our research team and were proposed internationally for application in actual practice for the prediction of soil pollution due to long term reuse of wastewater and sludge. These indices are as follows: (a) Elemental pollution Index (EPI), (b) Heavy Metal Load (HML), and (c) Total Concentration Factor (TCF) and (iv) construction of a computer program for the control of the reuse of TMWW and sludge, and forecasting soil pollution due to accumulation of heavy metal by means of pollution indices.