

Abstract

Wastewater treatment and reuse projects are usually associated with many obstacles, mainly financial, social, institutional and technical; political reasons and public acceptance are considered the main factors affecting the wastewater reuse in agriculture.

New recycling techniques should be employed to make use of the discharged wastewater. It is important to emphasize the vitality of water reuse to the Palestinian water sector since recycling the wastewater will lower the burden and pressure on the water resources.

wastewater contains variety of inorganic substances from domestic and industrial sources including a number of potential toxic elements such as arsenic, cadmium, chromium, copper, mercury and zinc, which present in concentrations likely to affect human health especially when the treated water is used for agriculture purposes, so it is needed to use a technique to remove these residues from treated wastewater to be safe when it is used for agricultural purposes. There are numerous processes for removing these toxic materials, one of the alternatives with low cost material as potential absorbent for the removal of heavy metals of trace quantities is zeolite which has the lowest capital and operational cost, and it is the most effective process for wastewater treatment due to molecular sieving, electrostatic fields, and polarizability properties.

The main objective for the study is to check the performance of zeolite material to be as a technique for wastewater treatment and as a fertilizing material to improve soil properties and increase crop yield. This research was conducted in the research field of Birzeit University, in order to study the effect of using secondary TWW from Al-Bireh wastewater treatment plant (WWTP) on soil amended with zeolite as well as the impact on the physical and chemical properties of soil, especially on its content of heavy elements. Concrete docks at three rows each row with 4 docks are built inside greenhouse filled with soil mixed with zeolite with four different percentages are (0%, 0.5%, 2.5% and 5%). Sorghum was the tested plants, to achieve the objectives for reuse experiment, the municipal treated wastewater produced by Al-Bireh treatment plant was used, and freshwater was used as a control and also used to irrigate the planted seeds until it pass initial grows stages. After analyzing collected water, wastewater, soil (before planting and after harvesting), and harvested plants samples, the results show that zeolite has a significant effect on soil structure, water content, and nutrients content in the amended soil which is essential for plant growth. On the other hand zeolite has a high capacity to absorb and accumulate toxic material at root zone (heavy materials) due to its ion exchange and sieving property.