The role of ashes of some plant waste in reducing water pollution and changing some soil characteristics and growth of wheat plant Tritichum aestivums L. irrigated with contaminated water

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Summary

For The purpose of tast and studying the efficiency of using four natural amendments which are rice husk ash , eucalyptus ash , concarpus ash , and powder of licorice roots and their effects on improving physical and chemical properties of the study soil by using waters have high electrical conductivity as drainage and waste waters in addition to tap waters as a control and their effects on growth parameters like dry weight , nitrogen , phosphorus , potassium concentration for wheat crop . In addition to determination the availability of above elements in the study soil after planting .

The study was Carried out with in Three sectors :-

First : Field Study

Soil Sample were taken from tow sitese : Al- Sharesh site ,north of Basrah , silty clay texture and Al- berjeseya site , loamy sand texture, where determined the physical and chemical properties of them. In addition to that , it is collected waste waters from university of Basrah site – Karmat- Ali and drainage waters from the back side of the university where the electrical conductivity was 60 ds m^{-1} preparing from above waters specific waters have electrical conductivity 10 ds m^{-1} determination the physical and chemical properties of them .

Second:Laboratory experiment is conducted where tested all of these amendments considering them as filters to all these kinds of waters mentioned above chosen two volumes to each filter (150 , 300) cm^3 .After preparing filter columns , it is passed drainage waters with electrical conductivity (10 , 60) dsm^{-1} and waste water with electrical conductivity 5 ds m^{-1} in all filters and collected these waters after filtration where determined cation and anion , hardness , turbidity , and some of heavy elements before and after filtration.

Third : Biological experiment conducted where wheat crop *Triticum aestivum* used for studying the efficiency of using amendments with kind of irrigation waters on two studied soils using factorial experiment with three factors 2 Soils* 4 amendments * 3 irrigation waters * 3 replicates + 6 control = 78 experimental units. Nitrogen , Phosphorus , Potassium fertilizers is added in one level according to the fertilization recommendation to wheat crop . plants were harvested after 60 days and shoots were drid at 65 c^{o}in oven and dry matter was recorded . Dry shoots were digested and Nitrogen Phosphorus , Potassum concentration was determind and calculation the availability of these elements in the soil after planting . As well , it is calculated the total concentration of some heavy elements like (Fe^{+2}, Cu^{+2}, Pb^{+2}, Cd^{+2}) for knowing soil pollution by these elements .

The results of the studay showed the following:-

1. The efficiency of amendments is different from each other on improving physical properties of studied soils (silty clay texture and loamy sand texture) irrigated by different irrigation waters where the best treatment was for the soil treated by rice husk ash and irrigated by waste water . The amendments were as below on improving mean weight diameter (MWD) , bulk density , total porosity and soil penetration resistance :

Rice husk ash > powder of licorice roots > eucalyptus ash > concarpus ash

As regards chemical properties of the study soils , noticed that all amendments have a negative impact leading to increase each of EC , pH , Ca^{+2} ,Mg^{+2} , Na^{+} , K^{+} , Cl^{-} .

2. The results of the laboratory experiment appeared when the amendments are used as filters for waters used in the study that the efficiency of these filters was high on reducing the studied properties of waters where high efficiency for drainage waters (60 ds m^{-1}) in contrast with drainage waters (10 ds m^{-1}) and waste waters (5 ds m^{-1}) where these filters are in order in their reducing the salinity.

Rice husk ash > concarpus ash > eucalyptus ash > powder of licorice roots

3. The results of biological experiment appeared that adding the amendments to the studied soils which are irrigated by different types of waters on growth parameters of wheat crop like dry weight , nitrogen , phosphorus , potassium concentrations in the shoot system in addition to calculation the availability of these elements in the studied soils after planting where appearing the best treatment was in silty clay treated by rice husk ash and irrigated by waste waters recorded higher dry weight of shoot system for wheat crop , higher nitrogen , phosphorus , potassium concentration , higher availability of these elements in the soil after planting and lower value of total concentration of heavy elements specially iron , that is , the soils is not polluted by these elements . In general , it is noticed that silty clay soil is superior on loamy sand soil in all studied properties .