

## **Abstract**

The study area is located in Marj Na'aja in the northern part of Jordan valley where the area is facing deterioration of soil and water quality. The soil became salinized with bad physical and chemical properties as result of using low irrigation water quality for long time. Therefore, the Ministry of Agriculture (MoA) tried to find alternative irrigation resource by installing desalinated water plant to desalinize the brackish water to use for irrigation.

The objective of this research is to study the impact of using desalinated water (DW) on saline soil properties especially Sodium Adsorption Ratio (SAR), soil structure, moisture content and to define the suitable blending ratio for irrigation to avoid expected negative impact on the heavy soil.

To achieve the research objective, four types of water, based on TDS content were considered. Raw brackish water with TDS 4500 ppm (T4), desalinized water with 200 ppm (T1), blending ratio between desalinated water and brackish water with 750 ppm (T2) and blending ratio with 1600 ppm (T3). The planted crop was tomato Izabella variety.

Soil sampling were conducted two times for four depths 0-15, 15-30, 30-45, and 45-60 cm, before crop season and after crop season to study Sodium Adsorption Ration (SAR).

Soil moisture content and EC were measured four times (after third irrigation, after one month of the planting date, after 2 months of planting date and after crop completion) for treatment 1 and treatment 4 at the four mentioned depths with 12 samples at each depth with 10 cm distance between sequent in the X-Y direction.

Soil structure was measured on site for all treatments before planting and after completion the growing season.

The results of the research showed increase of SAR values in T1 at all depths especially in depth one whereas SAR decreased in T2, T3, and T4. The lowest SAR was registered at T3. The study also showed that, the soil moisture content increased horizontally in T1 comparing with T4 while the soil moisture content increased vertically in T4 comparing with T1. The difference of water content between T1 and T4 refer to increase SAR and decrease the salinity in T1 while in T4 SAR was decreased and salinity was increased.

Soil structure results showed visible changes in structure type and structure grade in T1 whereas in T2, T3, and T4 there were no visible changes appears in the soil structure.