

Abstract

Agricultural wells salinization is a major problem facing the agricultural sector in Palestine. Over the past 3 decades, agricultural wells salinity has raised from 570 ppm in 1967 to reach 4500 ppm in 2012 and in some places (wells near the Dead Sea) it reaches more than 19000 ppm. The water salinity in the Jericho district is still under control but due to the excessive agriculture, over pumpage, excessive use of fertilizers and pesticides the problem will become more severe unless some strike management had been done.

In 2012, the Ministry of Agriculture has installed a small desalination unit with a total capacity of 60 m³/hr and electrical conductivity of 200 ppm to be used for agricultural purposes to irrigate the cultivated lands at Marj Na'aja village which is located 40 km north to Jericho city.

The main objective of the study is to assess the impact of using desalinated, blended, and raw brackish water on the heavy saline soil fertility, the tomato crop productivity, and tomato fruit quality.

Research hypothesis was that irrigating Heavy saline soil with desalinated water might affect the soil fertility and this will have a negative impact on the tomato plant productivity and fruit quality, and this effect could be accommodated by blended with raw saline water with a certain ratio.

The selected blending ratio were selected first based on the MoA recommendation to the farmers to irrigate with 750 ppm water concentration as at this ratio most of the crops can tolerate this salinity level and by this concentration the amount of water that is produced

from the desalinated unit can be increased, while the 1600 ppm is the salinity threshold for the tomato.

The research was conducted during the winter season of 2013/2014, where the seedlings were planted in October in a greenhouse that is located at Marj Na'aja village, four categories of water treatment were used in the research were T1 is the desalinated water with EC=200 ppm and two blended water treatments T2 with EC=750 ppm and T3 with EC=1600 ppm and the last treatment T4 the raw saline water with EC= 4500 ppm.

The main results that were found in this research were:

The heavy saline soil fertility decreased dramatically when irrigated with desalinated water with 200 TDS ppm for all macronutrients as the N decreases from 24.5 ppm (high) to 10 ppm (medium), P decrease from 31.25 ppm to 17, K decrease from 111 ppm to 65 ppm, and Ca decrease from 485 ppm to 108, while the raw saline water give the highest soil fertility as the concentration of the macro nutrients was slightly decreased at the end of cultivation season.

The tomato plant yield with blended water with TDS 750 ppm (20 kg per plant) followed by blended water with TDS 1600 ppm (18.8 kg/plant), then using raw saline water with TDS 4500 ppm (13 kg/plant), and the lowest value using desalinated water with 200 TDS ppm (12 kg/plant), the research results about the production are aligned with the production quantities documented by MOA (PCBS 2007-2010), according to their reports, the average productivity for the tomato seedling under same conditions in terms of the availability irrigation water and nutrients is 25-28 kg per seedlings.

Regarding the fruit quality significant variations in tomato fruit quality parameters were obtained (TSS) were lowest at TDS 200 ppm and highest when plants were irrigated with raw saline water of TDS 4500 ppm then with blended water with TDS 750, and 1600 ppm respectively.

Therefore, irrigating heavy saline soil with desalinated water of different salinity has detrimental effects on the soil fertility, tomato plant productivity and fruit quality. Therefore, negative aspects had been alleviated by irrigating with blended water, which has positive effects on soil fertility and tomato plant productivity and fruit quality.