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MANAGING THE CHEMICAL PROPERTIES OF THE SOIL BY USING DIFFERENT WATER QUALITIES AND SOME ORGANIC RESIDUES IN THE GROWTH AND YIELD OF WHITE CORN (*SORGHUM BICOLOR* L)

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ABSTRACT

A field experiment was carried out in the Potato and Tomato Production Project of the Babil Agriculture Directorate located in Al Mahawil District / Babil Governorate during the autumn growth season 2019/2020 to study the effect of using three levels of irrigation water as a main factor: mixed water (fresh water with drainage water) and medium salinity well water And another well of high salinity and the electrical conductivity was 1.9, 4.9 and 7.5 dSm^{-1} and its symbol is W1, W2, W3 respectively and by using 20% washing requirements with four types of organic waste, which are wheat straw (10 tons ha^{-1}), sheep milk, decomposed cattle milk and dumen Poultry (40 ha^{-1}) as a secondary factor and its symbol is M1, M2, M3, M4 and added to the layer 0-20 cm of soil and with three replications and the effect of their interference in some chemical properties of soil, growth and yield of white corn (Sorghum bicolor L.,). The study showed that the effect of irrigation water salinity led to a decrease in the average yield of white corn grains from 1.560 at a salinity level of 1.9 dSm^{-1} to 1.345 and 1.222 tons. ha^{-1} at 4.9 and 7.5 dSm^{-1}, respectively, with a decrease of 13.79 and 21.66%. The white corn yield achieved a relative yield of 100% at 3.05 dSm^{-1} soil salinity and 1.7 dSm^{-1} irrigation water. The salinity susceptibility threshold for soil and water was calculated mathematically from the linear regression equations and by adopting Mass & Hoffman's equation of 5.35 and 3.91 dSm^{-1} respectively. The effect of organic residues was significant in resistance. The plant for saline and water stress. And that the high levels of salinity caused an increase in the period from germination to 50% flowering, and the highest period at the salinity level of 7.5dSm^{-1}. The effect of organic residues was significant on plant heights and dry matter weights under different salinity levels and at each type of organic waste. The level of salts decreased after harvesting in the transactions that were added to it.

Keywords: white corn, irrigation, salinity, chemical properties

Introduction

Agriculture is the largest user of freshwater resources in the world, consuming 70% of fresh water, so water scarcity has become an important issue. The International Water Management Institute in Sri Lanka conducted an assessment of water resource management in agriculture in 2007 to see if the world has enough water to provide food for its growing population. It assessed the current availability of water for agriculture on a global scale and identified sites suffering from water scarcity. It found that one-fifth of the world's population, or more than 1.2 billion people, live in areas suffering from physical water scarcity, where there is not enough water to meet all their demands, and the shortage can be filled by using different types of available water to compensate for the shortage in the natural resources. In production. Several changes have occurred in the climate that have led to an increase in ET levels (water consumption of crop mm / season) and evaporation from land that has some salinity, increased salt deposits in it and increased air temperature in several countries of the world, and the speed of wind, type of radiation and dust are all factors that play their role. The problem of salinity in the soils of the middle Euphrates is not new. Rather, it has accompanied agriculture since its inception, and the speed of salinization has increased with the passage of time.The white corn crop ranks fifth in the world after wheat, rice, yellow corn and barley in terms of cultivated area. Cereals are used as the main food for humans in many African countries by mixing it with wheat flour at a rate of 50% (Yunus, 1987). It is a rich source of vitamin B. The cultivated area of it in the world reached 44.442 million hectares, producing 63.45 million metric tons. In Iraq, the cultivated area reached 3,500 hectares (Ibrahim, 1999). The study aimed to estimate the salinity threshold of sorghum in the field according to the administration data for the study area, and the effect of the interaction of salinity of irrigation water and organic fertilizer on some chemical properties of soil.

Materials and Methods

A field experiment was carried out for the fall season 2019 AD in the project of developing potato and tomato production in the area of Khanfara - Al Mahawil district of the Babil Agriculture Directorate, which is 15 km north of Hilla city and 85 km south of Baghdad, in soil with muddy mixed tissue classified according to the modern American classification [Soil Survey Staff, 2010] Within the rank of type torrifluvents, with an altitude of 33 meters above sea level, with a longitude N 34 38 32 32 North and a latitude E13 23 44 East Greenwich with hot dry weather, cold and rainy winter, annual precipitation rate of about 450 mm concentrated from November to May. The experiment in designing Completely Blocks Design Randomized by arranging split-plots, the field was divided into three sectors, the distance between one sector and the other is 1 m, each sector was divided into 15 experimental units (2 * 3) m and the distance between the experimental unit and another was 0.5 m. The experimental units were divided into Three lines with a distance between 0.5 m and 15-20 cm between plants and with three repetitions and three levels of irrigation water (1.9, 4.9, 7.5) dSm^{-1} respectively, representing the most important secondary factor and five levels of organic waste, which represent the main factor C, the total number of coefficients 45 and the total area of the field 409.5 m^2. Soil sampling and analysis to assess the fertility condition of the soil before planting and estimate some chemical and physical properties. Soil samples were taken using a auger to a depth of 25 cm and by the method of rectangular radii, the samples were mixed. It was air dried, crushed and passed through a diameter sieve with holes of mm^2 to conduct the required chemical and physical laboratory analyzes in the laboratories of the Department of Soil and Water Resources at the College of Agriculture - Al-Qasim Green of University.

Agricultural Operations and Cultivation of White Maize Agronomy Practises After carrying out all the necessary agricultural operations for cultivation, Sorghum bicolor L. Moench, a local variety (Sudanese), was sown in the autumn season on 9/1/2019 on Al Maruz, the distance between one line and another is 0.5 m and the distance between Jura and others 0.20 m to obtain a density of 53,000 plants / hectare (Ibrahim, 1999). I placed 4-5 seeds in each hole, with a depth of 0.04-0.05 m. The field was flooded with water (greenery). The patching process was carried out a week after planting, and the weeding was performed manually and periodically during the entire growing season. The plants were reduced to one plant per bot after two weeks of germination. Diazinon pesticide 10% at an amount of 16 kg / ha fed into the core of the plant 20 days after germination was used to control the corn stalk borer. DAP fertilizer was added to DAP (21% N + 46% P2O5) for all treatments at a rate of 89.25 kg P / ha when planting. Nitrogen fertilizer was added in the form of urea 46% nitrogen in two batches, the rate of each batch was 400 kg urea / hectare, the first batch after 25 days of planting and the second batch after 60 days and when flowering began (Ibrahim, 1999). Plants were harvested on 12/01/2019.

Experimental Factors

Irrigation water quality as a major factor on three levels: mixed water (river water + drainage water) and with the code W1. Well water (salt water) with the symbol W2. Well water (salt water) has the code W3. The electrical conductivity is 1.9,4.9, 7.5 dSm^{-1} sequentially and the secondary factor is plant waste at five levels: - without addition, addition of decomposed wheat straw, addition of decomposed sheep manure, addition of decomposed poultry manure, addition of decomposed cow manure: C: N Ratio 16: 1,12: 1, 9: 1, 17: 1 respectively and according to the recommendation of fertilizer 40 tons ha-1 for sheep, cattle and poultry manure. Wheat straw was 10 tons ha^{-1} and mixed with the soil to a depth of 30 cm and according to the type of treatment. The transactions were distributed randomly among the three sectors, and then each was narrated according to the quality of water allocated to it. The river water is transported through the medium (diesel pump) and the water of the first and second well by the mobile medium (gasoline pump) to irrigate the three sectors, each according to the quality of the water allocated to it from the side streams, after which the treatments are irrigated, each according to the quality of water determined by experiment with the amount of water related to the washing requirements calculated from the formula (Ayers & Westcot, 1976) which are:Among the values we obtained for the electrical conductivity of the saturated paste extract and water, and by applying the previous equation to calculate the washing requirements, the water of Well 1 is: 0.889 and Well 2 is: 0.142, and it is considered very high percentages. To calculate the depth of added water from the calculation of water needs according (Al-Hadithi, 1987). Water requirements are often affected by growth factors, environmental requirements, habitat and ripeness. The growth period for white corn to achieve maximum average production is from 110 to 30 days with water requirements of 450-650 mm water per season, while the daily water requirements vary according to the stages of growth (Kidambi *et al*., 1990) The water requirements were calculated from the previous equation and the coefficients were: = 888.2 mm

Irrigation is done when depletion reaches 50% of the ready water to reach the field capacity, and it is determined by taking soil samples continuously and determining the moisture content of them in the gravimetric method and at the tension of 33_1500 kPa.Chemical analyzes: ECe and soil reaction degree (pH): these were estimated in the pulp extract saturated with the Conductivity meter and pH meter (page. Et. Al. 1982). Positive and negative soluble ions: were determined by extracting saturated paste according to the methods described in Richards. 1954, and sodium using a flame photometer. Percentage of organic matter: Organic matter was estimated by wet digestion method according to the Walkly and Black method described in ICARDA (John Ryan, 2003).Cation exchange capacity (CEC): was estimated at (8.2: pH) according to the method proposed by Mario-polo, 1977) & Rhoades (. Total nitrogen: Total Nitrogen was determined according to Bremner & Keeney, 1965). Ready phosphorus: Available phosphorus . It was estimated according to (Olsen *et al*., 1954) (Murphy & Riley, 1962) and then measured with a Spectrum photo meter at a wavelength of 882 nm. Exchangeable potassium - according to the method described by (Martin & Sparks, 1983). Potassium was determined in all extracts using a flame photometer.Ionic strength: It was calculated in aqueous extracts of soil from the values of electrical conductivity and according to what was stated by (Griffin & Jurnak, 1973). Field measurements and accounts: data analysis and elaboration

The height of 5 plants was measured randomly using a tape measure, taking into account leaving the plants on the sides for each treatment, from the soil surface to the top of the flowerpot two weeks after flowering was completed (Garavetta *et al*., 1990). Emergence percentage: The number of plants per experimental unit was calculated and divided by the number of total seeds planted in each experimental unit and multiplied by 100. Field emergence percentage = the number of seeds emerging after 10 days / Total number of seeds × 100 The time period from germination was calculated up to 50% Flowers per treatment and the average weight of 500 grains per gram with 15.5% moisture (Gardener & Lonquist, 1961) The actual yield of grains (ton

ha^{-1}) The relative yield (%) of the grains and for all treatments using the equation:Relative yield = (grain yield for salinity treatment / grain yield for comparison treatment) x 100,

Assuming that the comparison treatment gives a sum of 100% for comparing the results. The relative yield of grains was also calculated mathematically at different salinity levels according to the equation (Maas, 1977 & Hoffman) with the following formula: Y = 100 - b (ECe - a) ……… (1) To find the value of b

b = 100 / ECe at 0% Yield - ECe at 100% Yield and from the linear regression equations obtained, the salinity susceptibility threshold was calculated fieldwise Maas, 1977] & Hoffman [and represented graphically to obtain the straight line equation Y, R to analyze the variance and find the significant differences Among the arithmetic averages, the Genestat program was used at 0.05 significant level to find the least significant difference.

Results and Discussion

The effect of irrigation water quality and organic wastes on the chemical properties of soil Numerical Acidity Scale: The increase in the electrical conductivity of irrigation water from 1.9 to 4.9 and 7.5 dSm^{-1} led to a decrease in the values of the degree of soil interaction for the two depths from (0-15) and (15-30) cm due to the accumulation of salts of sulfate and calcium chloride, magnesium and sodium. Which leads to reducing the degree of soil reaction to neutralization because it is neutral salts and this is consistent with what was found by (Rahil *et al.*, 2013; Al-Amari, 2015; Aboud and Nasser, 2014). Soil salinity is inversely proportional to the degree of reaction and this is consistent with With (Al-Zoghaibi, 2017) and (Al-Obaidi, 2015). The reason for this is that the increase in the salinity of the irrigation water affected the double electrophoresis of the concentration of dissolved salts (cations) that exchange with the bound hydrogen on the surfaces of the clay granules, which leads to the release of hydrogen ions and their increase in the concentration of hydrogen ions in the soil solution, which leads to a decrease in the degree of soil reaction, meaning the relationship between The electrical conductivity and the degree of reaction that depends on the concentration of free ions in the soil solution and the double electrical layer is affected by the increase in the concentration of hydrogen ions in the soil solution, which leads to its compression, which causes the exit of a percentage of hydrogen ions from the layer to the external solution in order to keep the hydrogen concentration inside the layer constant (Shafiq Others, 1990).

Table 1 : The effect of irrigation water quality and organic wastes on the degree of soil reaction

Irrigation water quality	Organic waste					averages
W_1	M_0	M_1	M_2	M_3	M_4	
W_2	7.31	7.0	6.9	6.85	6.95	7.0
W_3	7.1	6.95	6.98	6.82	7.0	6.92
average	6.5	6.85	6.9	6.85	6.65	6.75
L.S.D (0.05)	7.3	6.93	6.92	6.84	6.98	
	M	W*M	W			
	0.551	0.4321	0.562			

Table 2 : Some chemical properties of the used irrigation water

property	unit	Mixed water	Focus water1	Focus water2
EC	dSm^{-1}	1.9	4.9	7.5
pH		7.52	7.44	7.21
Ca^{+2}	mmol L^{-1}	2.70	3.2	5.98
Mg^{+2}		2.05	4.9	9.25
Na^{+}		. 2.9	14.0	20.15
K^{+}		0.20	0.32	0.45
^{-}Cl		5.01	16.1	22.01
SO_4^{-2}		1.80	4.95	0.70
CO_3^{-2}		–	0.12	0.20
HCO_3^{-1}		1.2	2.05	4.80
SAR	$(mmol.L^{-1})^{0.5}$	1.88	6.95	7.30

Table 3 : The chemical and physical properties of the studied soil

property	unit	value
pH		7,92
EC	dSm^{-1}	10.1
Totale Nitrogen	mmol L^{-1}	45
Ca^{+2}		12.2
Mg^{+2}		14.5
Na^{+}		58.1
K^{+}		0.26
P^{+}		9.5
HCO^{-}_3		6.0
SO_4^{-2}		11.3
Cl^{-}		64.5

CEC	Cmol+kg^{-1}	15.7
sand	g kg^{-1}	220
silt		200
clay		580
Soil texture		Clay loam
CaCO3	g kg^{-1}	7
O.M		11.2
C: N		13.39
Bulk density	Mg m^{-1}	1.4
Real density		2.32

Table 4 shows that the soil electrical conductivity after harvest decreased and for all treatments using mixed water 1.9, well water 4.9 and 7.5 dSm^{-1} respectively, several factors contributed to reducing soil salinity, including the use of 20% washing requirements to prevent the accumulation of salts transported with irrigation water in The surface layer and put it outside the root zone with the drainage water. The use of organic wastes also had an effective role in reducing soil salinity to the aforementioned depths. For its effect on increasing the tip of the soil through its high porosity and its large size compared to its mass, in addition to its work on regulating the temperature and moisture of the soil, which helps prevent the accumulation and accumulation of salts in the surface layer and facilitate the dissolution process, the role of agriculture is added through the penetration of the roots of plants that work to increase the porosity of the soil After decomposition, as well as excretion of organic acids that work to dissolve the salts surrounding the root zone and facilitate the process of dropping them with drainage water, with the presence of species of plants that can grow at certain levels of salinity and are considered salt-resistant somewhat, such as white corn, and this is consistent with what was found (Al-Amari, 2015) And (Al-Zoghaibi, 2017), which is that the effect of salinity of irrigation water is positive in dissolving part of the salts and washing them with drainage water when the salinity of irrigation water is less than the salinity of the soil. The effect of the interaction between salinity of irrigation water and soil salinity was significant, as the highest value was (7.5 dSm^{-1}) when irrigation with its electrical conduction water (7.5 dSm^{-1}) for the comparison treatment without addition, while the lowest value was (3.2 dSm^{-1}) for the treatment irrigated with water. River delivery (1.9 dSm^{-1}) treatment with decomposing sheep manure for the surface layer of (0-15) cm.

Table 4 : The electrical conductivity of the soil after harvesting for depth (0-15) cm

Irrigation water quality	**Organic waste**					**averages**
	M_0	**M_1**	**M_2**	**M_3**	**M_4**	
W_1	4.0	3.5	3.2	3.6	3.25	3.51
W_2	5.9	4.4	4.2	4.1	3.9	4.5
W_3	7.5	7.0	7.1	7.0	6.9	7.16
average	5.8	4.9	4.86	4.75	4.68	
L.S.D (0.05)	**M**	**W*M**	**W**			
	0.314	0.3577	0.2405			

Table 5 shows that the electrical conductivity values of irrigation water had a significant effect on the increase in the electrical conductivity values of the soil after harvest to a depth of (15-30) cm, as it increased for all parameters, and the highest value was recorded for the comparison treatment (W3M0) 9.8 dSm^{-1} that irrigated with well water whose salinity was 7.5 dSm^{-1} Without addition, the reason is the descent of salts carried along with irrigation water, which are present in the soil affected by the addition of the requirements of washing water from the surface layer to this depth.

Table 5 : The electrical conductivity of the soil after harvesting for a depth of (15-30) cm

Irrigation water quality	**Organic waste**					**averages**
	M_0	**M_1**	**M_2**	**M_3**	**M_4**	
W_1	5.5	4.3	4.8	4.7	4.25	4.71
W_2	8.8	6.9	7.0	6.95	7.0	7.33
W_3	9.8	8.2	8.4	8.3	8.0	8.54
average	8.03	6.46	6.73	6.65	6.41	
L.S.D (0.05)	**M**	**W*M**	**W**			
	0.413	0.576	0.3205			

Figure 1 shows the effect of the crop growth period in increasing the salinity of the soil due to the high salinity of the irrigation water causing the high salinity of the soil due to the accumulation of insoluble or resistant salts in the subsurface layer. Acceptable for the salinity of the soil, and the selection of crops with wedge roots that penetrate the sub-surface permeate layers to open drainage water channels that enable them to reduce the accumulation of salts in the surface layer.

The concentration of dissolved positive ions in the soil

The percentage of sodium adsorption is an important indicator that it expresses the overlap of three main cations in the soil, which are sodium, calcium and magnesium. From 0-15cm irrigated with saline water 1.9 dSm^{-1} for the comparison treatment W1M0, which recorded 5.20 mmol L^{-1}, which is the lowest value for the rest of the wastewater species 4.9, 7.5 dSm^{-1} in which the sodium concentration values were 18.0, 28.15 mmol L^{-1} in succession, for the positive effect of organic wastes that act as bonds between soil particles to collect them, in contrast to the action of sodium ions, which work to disperse the soil particles and demolish its construction.

Table 6 : The effect of water quality and organic wastes on the concentration of dissolved sodium ions in soil $mmol^{-1}$

Irrigation water quality	Organic waste					averages
	M_0	M_1	M_2	M_3	M_4	
W_1	5.20	5.0	4.90	4.85	4.80	4.95
W_2	19.2	19.0	18.80	18.2	18.0	18.72
W_3	30.2	28.2	29.1	29.4	28.15	28.21
average	18.2	17.4	17.6	17.84	17.45	
L.S.D (0.05)	M	W*M	W			
	0.52	0.78	0.38			

The effect of irrigation water quality and organic wastes on the yield of grain

The increase in electrical conductivity from 1.9 to 4.9 and 7.5 dSm^{-1} led to a decrease in the grain yield of white corn plants from 1.560 to 1.345 and 1.222 tons ha^{-1} respectively, with a decrease of 13.79% and 21.66% Regarding the salinity of irrigation water 4.9 and 7.5 dSm^{-1} respectively, the reason for this is due to the effect of the salinity of irrigation water on the chemical and physical properties of the soil. As for the effect of organic waste on the grain yield of the white corn plant, the results showed that the addition of organic wastes had a significant effect in increasing The grain yield compared to the comparison treatment as the values increased from 1,303 tons ha^{-1} for the comparison treatment to 1,383, 1.403, 1.406 and 1,378 tons ha^{-1} for each of the wheat straw, sheep manure, poultry manure and cow manure treatment respectively due to the positive effect of organic materials In improving the tip of the soil, reducing the bulk density of the soil, improving its construction, and through the regulation of osmotic effort, the regulation of soil temperature and moisture, and the regulation of the degree of soil interaction through which the nutrient readiness of the plant increases and thus the plant's resistance to salt stress increases. It increases the grain yield of sorghum plants (Major, 2010). As for the effect of the interaction between irrigation water and organic wastes on the yield of grains, the results showed that there are significant differences between the treatments and that the highest value is 1.630 tons ha^{-1} for treating poultry manure (W1M4) irrigated with river water. The reason for the increase in grain yield is the effect of nutrient rich poultry manure. Ready-to-plant plants are easy to absorb in addition to the positive effect on the physical properties (Zhang et al. 2010) and the lowest value is 1,200 tons ha^{-1} for the comparison treatment without adding organic wastes (W3M0) with irrigation with saline water of 7.5 dSm^{-1}. The reason for this decrease is attributed to the role of The salinity of the well water with high electrical conductivity negatively affects the soil and plants, and this is consistent with the findings of the mechanism (Abboud and Mohsen, 2015).

Table 7 : The effect of irrigation water quality and organic wastes on the yield of white corn grains (tons ha^{-1})

Irrigation water quality	Organic waste					averages
	M_0	M_1	M_2	M_3	M_4	
W_1	1.410	1.550	1.600	1.630	1.600	1.560
W_2	1.300	1.350	1.380	1.370	1.325	1.345
W_3	1.200	1.250	1.230	1.220	1.210	1.222
average	1.303	1.383	1.403	1.406	1.378	
L.S.D (0.05)	M	W*M	W			
	0.032	0.056	0.025			

The effect of irrigation water quality and soil salinity on the relative yield

To find the relative yield at any level of salinity, it is calculated from dividing the yield of any treatment of saline stress by the yield of the comparison treatment (the treatment that was not exposed to saline stress). The salinity levels of irrigation water were reflected on the values of the relative yield of sorghum yield during the autumn season, down by 13.79. And 21.66% for the salinity of irrigation water 4.9 and 7.5dSm^{-1} respectively, which led to a decrease in the salt tolerance level of the white corn crop. Figure 3 shows the effect of irrigation water quality on the actual relative yield of the white corn crop with salinity of irrigation water from 1.9 to 4.9 7.5 dSm^{-1} The scientists indicated that the relative yield of most agricultural crops is a linear function of the values of the electrical conductivity of the saturated paste extract of the roots layer after exceeding the value of the threshold salinity value, which is the electrical conductivity value after which the yield begins to decrease, and the sum is calculated From the equation: Linear regression equations were also adopted for these relationships which achieved acceptable values of correlation coefficient (r). Through these equations, the values of electrical conductivity were determined at which the relative yield is 100% (the threshold for being affected by salinity) under the conditions of the experiment, and it became clear that this value varies according to the levels of washing requirements. As for the values of b (slope), which indicate the rate of decrease of the yield for every one unit increase in the salinity of irrigation water or soil salinity, as this value also differed with different parameters, and this value indicates that there is a decrease in the relative yield when using high levels of salinity of irrigation water . The values of ECe and ECiw that achieve the relative yield values of white corn yield at levels 0, 25, 50, 75, 90 and 100% were calculated from Figures 4 and 5, and after extracting the straight line equation shown in Table 13, the increase in electrical conductivity of irrigation water from 1.9 To 4.9 and 7.5 dSm^{-1}, to a decrease in the relative yield of white corn yield from 100 to 85.89 and 78.2% respectively, and the value of the coefficient of determination R2 is 98% meaning that only 2% of the effects are caused by other factors such as environmental conditions and management practices and the main reason is The shortage of the yield is the salinity of the irrigation water. The figure below shows that increasing soil salinity from 4.68 to 4.75, 4.86, 4.9 and 5.8 led to a decrease in the relative yield from 100% to 91.5, 90.1, 89.93, 88.65 and 83.5%, respectively.

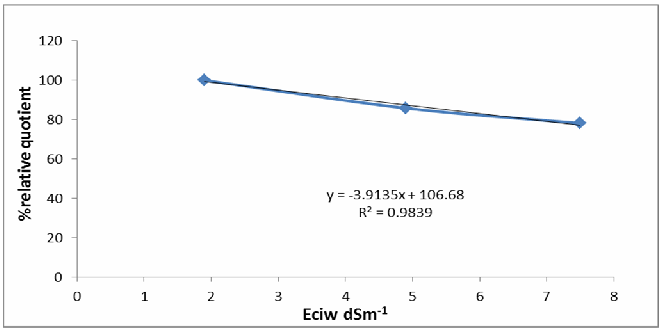

Fig. 1 : The relative yield of sorghum yield and according to washing requirements at different salinity levels of irrigation water

Through the representation of the salinity data for water and soil and the interaction between water and organic wastes in graphic forms, mathematical equations were obtained from which the relative yield can be calculated at different salinity levels as shown in Table 8 through which the yield of white corn can be predicted at different levels of soil and water salinity, especially for the Iraqi environment (region Study) for that

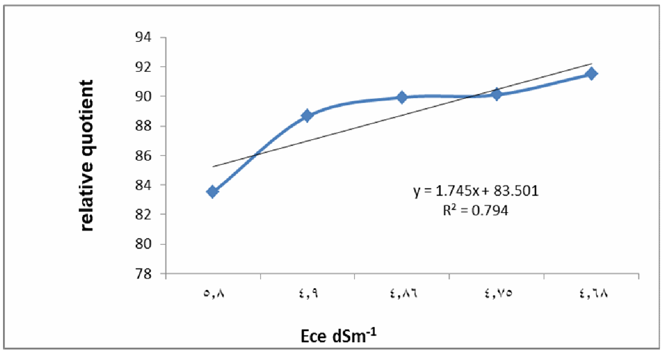

Fig. 2 : The relative yield of sorghum yield by the effect of different levels of organic matter on soil salinity.

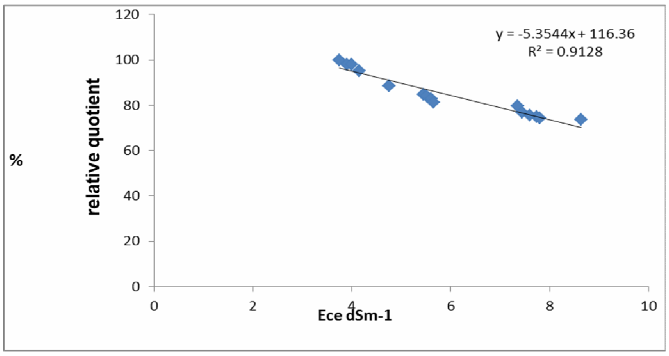

Fig. 3 : The relative yield of sorghum yield according to leaching requirements when salinity and organic residues interfere.

It is noticed that it differs from the equations obtained by (Hoffman & Maas, 1977). The relative yield of sorghum yield and its relationship to the salinity of irrigation water and soil salinity were calculated from the equations shown below in Table 23. The susceptibility threshold for soil salinity for white maize is 5.35 and for irrigation water it is 3.91 dSm^{-1} respectively. . It is evident from Table 9 that the values of soil salinity and salinity values of irrigation water at which different ratios of the yield 0, 25, 50, 75 and 100 are achieved for the experiment coefficients from the application of linear regression equations that reflected the relationship between these indicators and the relative yield in the conditions of the experiment with the use of washing requirements By 20%.

Table 8 : Equations for Predicting Relative Output from Straight Line Equations for White Corn Crop

Leaching requirements	**proportional quotient equations**	
20%	**ECiw**	**ECe**
	Y = 100-3.91 (ECiw-1.7)	Y = 100 - 5.35 (ECe - 3.05)

Table 9 : Values of electrical conductivity of irrigation water and soil at which different levels of relative yield are achieved

% Yield of white corn kernels											
0		**25**		**50**		**75**		**90**		**100**	
EC_{iw}	EC_e	EC_{iw}	EC_e	EC_{iw}	EC_e	EC_{iw}	EC_e	EC_{iw}	ECe	EC_{iw}	ECe
27.2	21.73	20.7	17.06	14.1	12.3	8.09	7.72	4.26	4.92	1.7	3.05

As for the effect of organic waste on the relative yield of sorghum plant, the decrease was 16.47, 11.34, 10.06, 9.87, and 9.82% for comparison treatments, straw, sheep milk, poultry and cows milk, respectively, in relation to the average of the comparison treatment, in which it is evident that the effect of organic waste in the relative yield was with a slight variation between them. The positive effect of organic materials in reducing the negative effect of water salinity.

The emergence rate of white corn plants: It is clear from Table 10 the effect of the quality of irrigation water and organic wastes on the percentage of emergence of white corn plants in the presence of significant differences according to the different types of wastewater.

Table 10: Effect of irrigation water quality and organic wastes on emergence rate (%)

Irrigation water quality	Organic wastes					averages
	M_0	M_1	M_2	M_3	M_4	
W_1	80.2	85.32	92.1	92.22	92.25	88.41
W_2	70.2	75	75.5	75.2	75.3	74.24
W_3	60.1	70.3	70.4	70.6	70.8	68.44
average	70.16	76.87	79.33	79.34	79.43	
L.S.D (0.05)	M	W*M	W			
	6.65	13.12	6.85			

When the salinity of irrigation water increased from 1.9 to 4.9 and 7.5dSm^{-1}, the percentage of emergence decreased from 88.41 to 74.24 and 68.44 respectively, and the reason for the decrease is attributed to the high salinity of irrigation water and soil that affects the holding of water molecules by the ions present in the irrigation water and soil. White maize is one of the crops in which seedling emergence is affected by high salinity (Fahd et al., 2000). As for the effect of organic waste, it was positive in the emergence rate compared to the comparison treatment without adding organic waste, as the highest percentage of emergence of degraded cows' blood was recorded for the types of water used in the experiment due to the role of organic waste in regulating soil moisture and temperature, which provides suitable mulch for seedling emergence.

The dry weight of the root total: It is clear from Table 11 that the effect of the quality of irrigation water and organic wastes on the dry weight of the root total of the white corn plant was significant, with significant differences in the different types of used water, when the electrical conductivity of the irrigation water increased from 1.9 to 4.9 and 7.5 dSm^{-1}. The dry weight of the root mass decreased from 10.95 to 8.65 and 7.51 g plant^{-1} respectively, and the reason is the role of salinity, which increases the bulk density of the soil and reduces its porosity, and this is consistent with the findings of the mechanism (Dohuki et al., 2013). As for the effect of organic residues on the dry weight of the root group, it was positive, with a significant effect on increasing the dry weight of the root group compared to the comparison treatment, as the values increased from 6.51 g vegetable^{-1} to 8.2, 10.1, 10.12 and 10.5 g plant $^{-1}$ for each treatment of wheat straw and dumen Sheep, poultry and cattle milk respectively due to the role of these residues in improving the physical properties of the soil. They reduce the bulk density of the soil, increase its porosity, increase the moisture content, as well as the chemical properties of the soil, from regulating soil moisture and temperature, the degree of reaction, and reducing the values of electrical conductivity.

Table 11 : Effect of irrigation water quality and organic wastes on yield of dry matter gm plant $^{-1}$ of the root group of white corn

Irrigation water quality	Organic wastes					averages
	M_0	M_1	M_2	M_3	M_4	
W_1	7.65	8.5	12.5	13.2	13.4	10.95
W_2	6.1	8.1	9.5	9.8	9.85	8.65
W_3	5.81	8.0	8.4	8.6	8.61	7.51
average	6.51	8.2	10.1	10.12	10.5	
L.S.D (0.05)	M	W*M	W			
	0.32	0.36	0.21			

Conclusion

The results of this study showed the following:

- The white corn crop of medium tolerance to salinity achieved 100% yield when soil salinity was 3.05 and irrigation water salinity 1.7 dSm^{-1} respectively, while the salinity vulnerability threshold was 5.35 for irrigation water and 3.91 for soil with the use of 20% washing requirements.
- The increase in the electrical conductivity of the used irrigation water has negatively affected some chemical properties of the soil, including the increase in electrical conductivity, the decrease in the degree of soil interaction and the high percentage of salt accumulation in the soil. Improve the tip of the soil and facilitate the movement of salts with drainage water.
- The use of organic matter with the addition of 20% washing requirements was the most effective in terms of the amount of dissolved salts. The amount of residual salts is inversely proportional to the amount of organic matter added.
- Increasing the electrical conductivity of the used irrigation water negatively affected all the growth and yield indicators of the white corn plant, while the use of added organic wastes reduced the negative effect of salt stress, which is reflected in the improvement of plant growth and yield.

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