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STUDING THE ADVERSE IMPACT OF SALINITY ON CANOLA VEGETATIVE GROWTH, SEEDS YIELD AND OIL PRODUCTION.

Hamza, A. M.[*] ; Omaima M. Abd El-Kafie[*] ; Mahassen A. Sidky[#] and Wallaa S. Al-Batrawi[*]

(*)Floriculture and Ornamental Dept., Fac. Agric., Mansoura Univ., Egypt

(#)Medicinal and Aromatic Plants Research Dept.Horticulture Institute, Agricultural Research Center.

ABSTRACT

The current research was conducted at Agricultural Experience Station, Faculty of Agriculture, Mansoura University, Egypt. This work was postulated to study the effect of salinity on growth and yield of canola, as well as the oil content of seeds as quality and quantity. Potted soils were artificially salinized by sodium chloride solution and then drying the soil aerobically. Control treatment potted with untreated soil (0.2%). Seeds were obtained from "Ministry of Agriculture, Oil Crop Research Center" Giza, Egypt. Twenty seeds were planted in every pot. Results indicated that decreasing in vegetative growth with increasing the salinity when comparing with control treatments. However, observed data in the study, showed the maximum means of seeds yield all over the tested yield parameters observed with control treatments and decreased with increasing salinity. Same trend occurred in oil content and edible quality, which were decreased when salinity increased. Thus, it could be concluded that salinity had a detrimental effect on improving growth of canola plants, decreasing growth and suppressing seeds yield and edible oil production.

INTRODUCTION

Canola (*Brassica napus* L.) belongs to the family Brassicaceae and is a relatively salt-resistant glycophyte. This is suggested by the data indicating that canola seeds germinate at the salt concentrations in soil lethal for true glycophytes, and the productivity of this plant does not decline under mild soil salinity. There is a point of view that a salt tolerance of canola plants depends on their ability to accumulate toxic ions, Na and Cl, in the vacuole, which minimizes negative effects of these ions on cell metabolism, Mokhamed *et al.,* (2006).

All over canola cultivars that currently registered, 76 of which are winter types. Since the introduction of the first restored winter canola hybrid variety in1995, the proportion of hybrids has grown steadily, with 21 current hybrids comprising almost a third of the 76 registered winter canola varieties. In terms of cultivation, hybrids already represent more than 50% of the canola growing area a trend that reflected in all of the major growing areas for canola worldwide. The newest generation of winter canola hybrids display improved yield performance and stability, and also achieve high and stable oil contents, Wittkop *et al.,* (2009).

Fat is generally a highly valued element of the diet to provide energy, palatability to dry foods or to serve as a cooking medium. However, some foods rich in fat have a low fat quality with respect to nutrition, such as a relative high content of saturated fatty acids as compared to unsaturated fatty acids. High-fat dairy products and fatty meats are examples of foods with low fat quality, whereas vegetable oils are products with a generally high fat quality, Zevenbergen *et al.,* (2009).

Fatty acids can be classified in classes as saturated, monounsaturated and polyunsaturated fatty acids. On the other hands, the unsaturated ones classified into series known as omega, being omega 9 considered nonessential to human, and the omega 3 and omega 6 as essential fatty acids, Zambiazi *et al.,* (2007).

Canola seeds contain 40:46% oil; the fatty acid composition of the oil is genetically more variable than probably the composition of any other major vegetable oil. Canola oil is one of the richest sources of dietary monounsaturated fatty acids and is a good source of the omega-3 polyunsaturated fatty acid. The oil content 5:8% of saturated fat, 60:65% of monounsaturated fats and 30:35% of polyunsaturated fatty acids. Recent advances using conventional plant breeding have led to the development of high-oleic canola, which has an increased level of monounsaturated fatty acids and greater oxidative stability, making it suitable for a wide range of culinary purposes including frying, cooking oil, salad oil and making margarine, Harland (2009).

Salinity is the presence of soluble salts in soils or waters. It is a general term used to describe the presence of elevated levels of different salts such as sodium chloride, magnesium and calcium sulfates and bicarbonates, in soil and water. It usually results from water tables rising to, or close to, the ground surface. Soil salinity is a serious environmental constraint to crop production in many parts of the world. Salts stress adversely affects plants at all stages of its life cycle. Salinity causes several specific structure changes that disturb plant water and nutrients balances. The shape and size of plant organs and cells may be changed in response to salt stress. This includes increased leaf succulence, decreased leaf area and number. Therefore, in plants the uptake of some mineral nutrient dissolved in water are also districted. Thus, growth and development of plants are inhibited due to the occurring defect in metabolism, Maha Othman (2007).

Therefore, the aim of this study was to investigate whether the presence of salinity in canola growing media would induce the growth parameters, seeds yield, oil content and oil components.

MATERIALS AND METHODS

A pot experiment was conducted in "The Agricultural Experience Station of Mansoura University" - Egypt, during to the successive seasons of (2010/2011) and (2011/2012). This work was postulated to investigate the effect of salinity levels on vegetative growth, seeds yield, chemical composition of leaves and seeds, oil content and oil components in canola plants of Seru 4.

Experimental soil:

Pots in the experiments were filled with a clayey loam in texture soil. The values of mean contents were (38.07%) sand, (30.64%) silt and (31.29%) clay. This clayey loam texture reflects the physical characteristics of soil where, saturation percentage was (61.72%), bulk density (1.29 g/cm^{-3}) and real density (2.69 g/cm^{-3}). The analysis also illustrate that soil pH was 7.49. The soil is non saline, where electrical conductivity (EC) was 1.61dSm^{-1}. Soil organic matter content was 0.51%.

Preparation of pots:

The experiments have been implemented in plastic pots measuring 50 cm in height and 40 cm in diameter. In each pot a thoroughly water-washed gravel of 2-3 cm diameter was added on the bottom in about 10 cm thickness. Each pot was filled with twenty kilograms of the experimental soil air dried. A design for sub irrigation and aeration were used. A plastic tube about 60 cm long and 2 cm diameter was installed vertically elevated 5 cm from the bottom of pots ended in the middle of the gravel layer in the bed.

Potted soils were artificially salinized by sodium chloride solution and then drying the soil aerobically. Ten salinity levels were used in the study beginning from control treatment potted with untreated soil (0.2%), ended with 1.1% salinity(s.r.).

Salinity treatments were as follows: 1) Control, 0.2%, No salinity added.
2) Salinity level 0.3%. 3) Salinity level 0.4%. 4) Salinity level 0.5%.
5) Salinity level 0.6%. 6) Salinity level 0.7%. 7) Salinity level 0.8%.
8) Salinity level 0.9%. 9) Salinity level 1.0%. 10) Salinity level 1.1%.

Experimental Design:

Seeds were obtained from "Ministry of Agriculture, Oil Crop Research Center" Giza, Egypt. Twenty seeds of Seru 4 were sown on 12th November ,(2010 and 2011) in each pot. After three weeks from sowing, the plants were thinned to leave only six uniform plants per pot. All agricultural processes such as soil preparing, weeding and plant protection were carried out as recommended by The Ministry of Agriculture. After 162 days canola was harvested on 22nd April (2011 and 2012).

Treatments were repeated with three times, total number of pots in the study were 30. Pots were then randomly arranged in the agricultural experience station farm. Fertilizations done as recommended: Nitrogen: 60kg N/fed, Phosphorus: 120kg P/fed and Potassium: 50kg K/fed. Plants were watered regularly as needed, using surface and subsurface ways with tap water. Ninety days after planting, two plants were collected to get the data dealing with:

1. Plant height was measured in (cm) from the soil surface up to the end of the highest inter node of the main stem.

2. Inflorescence lengths(cm) measurement of inflorescence was from the last mature green leaf to the end of the flower.
3. Branch number/plant.
4. Leaves water (%).

Seeds were collected on the day of harvest to do some measurements and analyzes regarding with:

1. Pods Number per plant.
2. Seeds number per pod.
3. 1000 seeds dry weight (gm/1000 seeds).
4. Seeds yield weight(gm/plant).

Seeds were composed and carried to the laboratory to extract oil owing to counting the oil content, and so as a prelude for the quantitative analysis of fatty acids contents as follow:

1. Oil percentage was determined by soxhiet apparatus using petroleum ether as a solvent according to the (A.O.A.C., 2000).
2. Fatty Acids Compositions: methyl esters of fatty acids were obtained according to (A.O.A.C., 1992) at "Central Laboratory High Institute of Public Health", Alexandria University, Egypt.

Statistical analysis:

Statistically, collected data were subjected for the statistical analysis. The technique of analysis variance (ANOVA) according to (Gomes and Gomes, 1984) was adopted. The treatment means were compared using the least significant difference (LSD 5%). All statistical analysis was performed using analysis of variance technique by means of Co-STAT computer software package.

RESULTS AND DISCUSSION

The studied attributes of canola vegetative growth parameters as affected by the salinity levels were recorded in Tables(1, 2, 3 and 4). First section aims to study some vegetative growth parameters of canola plants as affected by the salinity levels when the plants got 90 days after the planting. Data presented in Table (1) illustrate the impact of salinity levels on plant height, inflorescence length, number of branches per plant and leaves water percentage when the plants got 90 days after the planting.

Conspicuously changes were obtained in plant height in the presence of salinity at different levels. Lowest values were shown in the table with 1.10%SL inducing dwarfing heights as 29.11 cm. But lengths increased with decreasing the salinity to be the tallest with 0.3% SL to be 138.26 cm. On the other hand value was 148.84 cm, with control treatment. Data in Table 1 also showed that the tallest inflorescence lengths occurred with 0.3% SL treatments 36.26 cm. Nevertheless, with existence maximum salinity level, inflorescence length decreased sharply to be 5.45 cm. But control treatments induced the tallest one that was 41.41cm. Taking branch number into the account, Table 1 presented pure differences among the treatments. Means with control treatment was 10.00 branch per plant. Minimum number obtained was with highest salinity level which gave only 2.00 branch per plant with 1.10%SL. However, maximum mean found was with 0.3% SL treatment was 9.33 branch per plant. Given a flash to the leaves water percentage as showed in Table 1, it was noticed that included highest value with 0.3% SL treatment, hence was 57.48%. Control treatment value was 58.03%. Lowest value was found with maximum salinity existence (1.1% SL), since It was 45.98%. All vegetative parameters data in the second season possess approximately the same trend in the first season.

Table (1): Effect of salinity levels on Plant height, Inflorescence length, Branch number, and Leaves water after 90 days from planting in the two seasons during 2010/2011 and 2011/2012 seasons.

Characters	Plant height (cm)		Inflorescence length (cm)		Branch number		Leaves water (%)	
Treatments Salinity levels (%)	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season
0.2 (Control)	١٤٨.٨٤	١٥٤.٨٠	٤١.٤١	52.52	١٠.٠٠	10.67	٥٨.٠٣	٥٥.٩٧
٠.٣	١٣٨.٢٦	١٣١.١١	٣٦.٢٦	٤٧.٣٣	٩.٣٣	٩.٠٠	٥٧.٤٨	٥٥.٥١
٠.٤	١٣١.٠٢	١٤٠.٩٢	٣١.٥٠	٤٤.٨٦	٨.٣٣	٨.٦٧	٥٧.٠٩	٥٤.٩١
٠.٥	١١١.٩٧	١٢٢.٥٥	٢٦.٠٤	٣٧.٢٥	٧.٣٣	٨.٠٠	٥٦.٤٢	٥٤.٦٩
0.6	٩٥.٧٩	١٠٧.١٥	٢٠.٩٣	٢٨.٢٥	٦.٠٠	٧.٣٣	٥٤.٤٠	٥٣.٨٣
0.7	٨١.١٤	٩٠.٦٠	١٧.٠٤	٢٣.٨٧	٤.٦٧	٦.٦٧	٥٢.٩٧	٥١.٤٦
0.8	٦١.٩٣	٧٠.٥٧	١٣.٥٣	١٩.٠٣	٤.٠٠	٦.٠٠	٥١.٧٢	٥٠.٨٠
0.9	٤٨.٨٩	٥١.٦٠	٩.٣٠	١٥.٦٤	٣.٣٣	٥.٠٠	٤٩.٥٢	٤٩.٥١
1.0	٣٩.٩٢	٤٩.٩٩	٨.٣٠	١١.٢١	٢.٣٣	٤.٣٣	٤٦.٦٩	٤٨.٤١
1.1	٢٩.١١	٥٥.٣٦	٥.٤٥	٧.٩٩	٢.٠٠	٣.٠٠	٤٥.٩٨	٤٧.٦٧
LSD at 5%	٤.٥٨	٨.٤٢	٤.٨٧	٣.٢٠	١.٥٥	٢.٤٨	٠.٧٧	١.١٠

1st = First season **2nd = Second season**

These results were in agree ment with those results obtained by El-Shazly (2001) who found that the harmful effect of salt on plant growth is mainly attributed to the increase in the osmotic pressure of soil solution, which reduces the ability of plant to absorb water and nutrients. The total concentration of salt and relative concentration of each cation or anion induce disorder in plant nutrition due to calcium, magnesium or sodium as well as bicarbonate or chloride and carbonate. And agreed with Anna Sheldon *et al.,* (2002) who found that, the canola growth parameters were reduced even from the low salt concentrations. As Parvez *et al.,* (2007) who found that the salinity presence in root zone would reduced plant growth parameters such as plant height and biological yield significantly over control. So Sunil Kumar *et al.,* (2008) since who explained that the fresh and dry weights were gradually decreased with increasing the salinity levels gradual decrease in both fresh and dry weights of canola plants with increasing salinity doses. Monreover, Bybordi and Tabatabaei (2009) since they approved that increasing salinity levels were associated with decrease rate of germination, radical and plumule length and fresh weight. Finally, Bybordi (2012) reported that when a plant grown in salinity resulted in a smaller leaf area, lower plant fresh and dry matter and lower photosynthesis in all canola cultivars.

Following section will focus on yield parameters of canola plants i.e. pods number per plant, seeds number per pod, 1000 seeds weight and seeds dry weights, as affected by salinity levels as presented in Table 2. As a matter of fact, any factor effect in the vegetative performance, actualize changing the yield face.

About the effect of salinity levels on pods number per plant, it goes no far from the effect of salinity presence on other yield parameters. As showed, clearly in Table 2 there were apparent differences among all treatments of salinity levels. Highest records obtained were 0.3% SL that 316.33 pods per plant. Whereas, lowest mean recorded was 98.00 pods per plant, as obtained with 1.10% SL. Control treatment showed the largest number that presented 339.33 pods per plant. Regarding to the effect of salinity treatments on the number of canola seeds per pod, data in Table 2 cleared that seeds number were clearly decreased when canola was treated with higher salinity levels as compared to the control. Value was 34.33 seeds per pod recorded from pots of control treatments. In the contrary, the lowest value was 10.33 seeds per pod, obtained from presence the maximum salinity concentration (1.10% SL). The closest value to counted was 33.00 seeds per pod was of the plants treated with 0.3% salinity.

Table (2): Effect of salinity levels on Pods Number per plant, Number of seeds per pod, 1000 Seeds weight and seeds weight planting in the two seasons during 2010/2011 and 2011/2012 seasons.

Characters / Treatments Salinity levels (%)	Pods Number per Plant		Number of Seeds Per Pod		1000 Seeds Weight (gm/plant)		Seeds Weight (gm/plant)	
	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season
0.2 (Control)	339.33	٣٢٧.٦٧	٣٤.٣٣	٣٥.٦٧	٣.٤٩	٣.٣١	٤٢.٣١	٣٨.٦٧
٠.٣	٣١٦.٣٣	٣١٩.٦٧	٣٣.٠٠	٣٤.٣٣	٣.٣٤	٣.٢٥	٣٦.٤٥	٣٥.٦١
٠.٤	٢٨٦.٣٣	٣٠٤.٣٣	٣٠.٠٠	٣١.٠٠	٣.٠٥	٣.٢١	٢٥.٩٥	٣٠.٢٩
٠.٥	٢٤٩.٠٠	٢٨١.٦٧	٢٧.٠٠	٢٩.٠٠	٢.٦٣	٣.٠٩	١٧.٤٤	٢٥.٤٣
0.6	٢١٨.٠٠	٢٥٤.٣٣	٢٣.٣٣	٢٤.٣٣	٢.٤٥	٢.٩٤	١١.٨٠	١٨.٢٦
0.7	١٨٦.٦٧	٢٣٢.٣٣	٢١.٠٠	٢١.٦٧	٢.١٤	٢.٧٠	٨.١٩	١٣.٦٤
0.8	١٦٦.٦٧	٢٠٥.٣٣	١٩.٠٠	٢١.٠٠	١.٩٧	٢.٤٢	٦.١٤	١٠.٤١
0.9	١٣٩.٦٧	١٩٥.٦٧	١٦.٦٧	١٨.٣٣	١.٨٢	٢.١٢	٤.٣٦	٧.٥٩
1.0	١٢٢.٠٠	١٦٥.٦٧	١٥.٣٣	١٥.٣٣	١.٥٨	١.٩٩	٢.٨٤	٥.٠٣
1.1	٩٨.٠٠	١٤٠.٠٠	١٠.٣٣	١٣.٠٠	١.٤٧	١.٦٧	١.٤٩	٣.٠٠
LSD at 5%	١٤.٢٠	١٦.٩٩	١.٦٨	٣.٩١	٠.١٧	٠.١٦	٢.٦٤	٣.١١

1st = First season **2nd = Second season**

Concerning the 1000 seeds weight data in Table 2 show that raising salinity levels negatively decreased the dry weights of 1000 seeds. Dry weight of 3.49 gm per 1000 seed was found with control treatment, resembling the heaviest weight as compared with all the other treatments. Lowest value was 1.47 gm per 1000 seed occurred with 1.10% salinity. As 0.3% SL treatment gave the heaviest value that was 3.34 gm per 1000 seeds. About the effect of salinity levels on seeds yield weight, it is apparent the same effect of salinity existence on canola previous parameters was found. As showed, clearly in Table 2 there was intelligible differences among all salinity levels. Control treatment gave the most heavy weight 42.31 gm per plant. Highest seeds yield weight obtained with 0.3% SL treatments was 36.45 gm per plant. Whereas, lowest mean recorded of canola dry yield weight which was 1.49 gm per plant was obtained with 1.10% SL. Same trend of yield parameters as in the first season, was found in the second season.

These results in harmony with the findings of Javaid *et al.,* (2002) and Humaira and Rafiq (2003) in reducing each of seeds number per pod, pods number per plant, seed yield per hectare and 1000 seed weight as responding to salinity presence. And Badr *et al.,* (2005) who decide that salinity has a depressing effect on various yield parameters: number and weight of pods, straw and seed yield and seed index. As so Parvez *et al.,* (2007) stated that all yield parameters were decreased with increasing root zone salinity. And so Al-Solimani *et al.,* (2010) cleared that salinity significantly decreased pods number per plant and seed weight per plant. As agreement with Shahbazi *et al.,* (2011) in the relative salinity tolerance of canola significantly correlated with pods per plant and seeds number per pod.

These are the finally sections, which aims to study the oil percentage and oil components of canola seeds i.e. oil percentages and some lipid acids percentages in canola oil as affected by the salinity levels are presented in Tables 3 and 4.

Table (3): Effect of salinity levels on oil percentage (during tow season), Palmitic , Stearic and Arachadic fatty acids percentages in canola seeds(during first season).

Characters	Oil (%)		Palmitic acid (%) (First season) (2010-2011)	Stearic acid (%) (First season) (2010-2011)	Arachadic acid (%) (First season) (2010-2011)
Treatments Salinity levels (%)	First season (2010-2011)	Second season (2011-2012)			
0.2 (Control)	٤٥.٢٢	٤٤.٦٣	1.05	1.07	0.28
٠.٣	٤٤.٠٦	٤٣.٧٩	1.42	1.23	0.33
٠.٤	٤٣.٣٥	٣٨.٩١	2.09	1.60	0.42
٠.٥	٣٨.٦٤	٣٤.٥١	2.73	1.96	0.41
0.6	٣٦.٢١	٣٣.٦١	3.12	2.17	0.46
0.7	٣٣.٧١	٣١.٢١	3.87	2.43	0.64
0.8	٣٠.٧١	٣١.١٣	4.24	2.62	0.52
0.9	٢٩.٥٣	٢٦.٣٢	4.70	2.81	0.82
1.0	٢٨.١٨	٢٥.٢٧	5.04	3.09	0.92
1.1	٢٥.٦٣	٢٤.٧٣	5.52	3.41	1.15
LSD at 5%	١.٦٩	١.٩٢	0.19	0.16	0.08

Existing differences were obtained in oil percentage in canola seeds by presence different salinity levels, most oil percentage found in Table 3 with 0.3% SL that was 44.06%, decreased with increasing salinity concentration.

Lowest oil percentage was 25.63%, with maximum salinity treatments, value was 45.22% with control. Oil percentage in the second season observed approximately the same trend as in the first season. The lowest value of Palmitic fatty acid occurred with 0.3% salinity treatment (1.42%), as shown in Table 3. But control ones gave (1.05%) only. Nevertheless, with existing the maximum salinity level, value increased to be 5.52%. Also, Stearic fatty acid showed clearly differences, lowest value of which was (1.23%) was found with 0.3% salinity treatment higher than control treatment (0.2% salinity) that gave 1.07%.

However, maximum mean of Stearic acid percentage achieved was with the highest salinity level as been (3.41%), with 1.10% salinity. Changes were obtained in Arachadic fatty acid percentage with raising salinity in different levels. Highest value was obtained with 1.10% salinity that been (1.15%), but lowest value of 0.33%, was with 0.3% salinity treatments while it was 0.28% with control plots.

Data in Table 4 revealed differences among all salinity levels regarding all studied unsaturated fatty acids. Nevertheless, with presence maximum salinity level 1.10 % SL, Oleic fatty acid decreased significantly to be 45.49% as compared with other salinity levels. Actually the highest value of 63.25% was of control treatment plants. This value was followed by 0.3% salinity level hence it was 62.53%. Linoleic fatty acid in Table 4 showed between salinity levels. The highest value of 20.18%, was found with the 0.3% salinity treatment. But the highest value of 20.95%, was observed with control treatments. However, lowest means occurred with the highest salinity level as been (14.53%) with 1.10% salinity. Different changes were observed in Linolenic fatty acid percentage by applying salinity with different levels. Lowest value was shown in Table 4 with 1.10% salinity (6.01%). But values increased with decreasing the salinity. Accordingly, the highest value was (9.49%) with 0.3% SL treatments, and been (9.68%) with control plots.

Table (4): Effect salinity levels on oleic, linoleic, linolenic and eurcic fatty acids percentages in canola seeds.

Characters / Treatments Salinity levels (%)	Oleic acid (%) (First season) (2010-2011)	Linoleic acid (%) (First season) (2010-2011)	Linolenic acid (%) (First season) (2010-2011)	Eurcic acid (%) (First season) (2010-2011)
0.2 (Control)	63.25	20.95	9.68	0.13
٠.٣	62.53	20.18	9.49	0.21
٠.٤	60.25	19.64	9.03	0.37
٠.٥	57.36	19.05	9.01	0.49
0.6	55.19	18.78	8.52	0.85
0.7	52.74	18.03	7.77	1.06
0.8	51.25	16.54	7.36	1.40
0.9	48.28	15.72	6.96	2.09
1.0	47.06	14.91	6.57	2.25
1.1	45.49	14.53	6.01	2.61
LSD at 5%	1.55	0.42	0.27	0.18

Concerning Eurcic fatty acid, data in Table 4 showed the effect of salinity treatments on Eurcic fatty acid, and indicated that mean values of Eurcic fatty acid contents tended to increase with salinity presence increases. The highest mean was 2.61% with maximum levels of salinity (1.10% salinity). Control treatments gave (0.13%) only. On the other hand, the lowest mean value was (0.21%), was obtained with 0.3% salinity plants, about one third but difference that of control.

These results were in accordance with the results obtained by Zambiazi *et al.,* (2007) that canola oil presented the highest unsaturated fatty acids contents and omega-3 fatty acids, fatty acid can be classified in classes as saturated, mono and poly-unsaturated fatty acid and the rate of saturated to unsaturated fatty acids is very important for human nutrition. While high levels of saturated fatty acid is desirable to increase oil stability, on the other hand, nutritionally they became undesirable, because high levels of saturated fatty acids. And Zhao *et al.,* (2008) in the close interrelationship between fatty acid composition and oil content, which should be considered when breeding for increased oil content or improved oil composition in canola. Bybordi (2011) had an apparent agreement in response to salinity stress, fatty acids composition varied because of different salinity levels, the results indicate that there was a positive correlation between oleic and linolenic acid. Saturated fatty acids accumulation increased dramatically due to salt stress.

Dealing with the results presented in this study, it was indicated that salinity has a ruinous role on vegetative parameters and growing which reflected on seeds yield, oil content and oil quality. *Finally* we can conclude that we can get an edible oil from Seru 4 wherever the salinity level was less than 0.9%. Consequently, most of salt affected soils can be distributed in Egypt used economically, for canola production for its variable uses and oil in particular.

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دراسة الأثر السلبي للملوحة على النمو الخضري والمحصول البذري وإنتاج الزيت لنبات الكانولا.

علـي منصـور حمـزة ، أميمـة محمـد عبـد الكـافي , محاسـن عبـد الغنـى صـدقى و ولاء سامي أحمد عبده البطراوي.
جامعة المنصورة - كلية الزراعة – قسم الخضر و الزينة.

اجرى هذا البحث بالمزرعة البحثية ومعمل أبحاث قسم الخضر والزينة بكلية الزراعة جامعة المنصورة خلال موسمي الزراعة المتتالين ٢٠١٠/٢٠١١- ٢٠١١/٢٠١٢
وذلك بهدف دراسة تاثير مستويات مختلفة من الملوحة عند مسويات (٠.٣-٠.٤-٠.٥-٠.٦-٠.٧-٠.٨-٠.٩-١.٠-١.١)% على النمو الخضرى ومحصول البذور ونسبة وتركيب الزيت لنبات الكانولا (*Brassica napus* L.)
صنف سرو ٤ وقد اظهرت النتائج ان قياسات النمو الخضرى قد انخفضت بدرجة معنوية انخفاضاً موازياً مع مستوى الملوحة فى وسط الزراعة وقد اشارت النتائج ايضاً ان نباتات الكانولا قد عانت من زيادة الملوحة حيث اعطت اقل نسبة الزيت فى البذور بزيادة الملوحة بلاضافة الى ان اظهر التحليل الكروماتوجرافى لعينات الزيت زيادة محتوى الزيت من الاحماضى الدهنية المشبعة مثل حمض البالمتيك والاستياريك والاراشيديك لكن الاحماض الدهنية الغير مشبعة مثل حمض الاوليك واللينوليك قد انخفضت مع زيادة الملوحة فى وسط الزراعة واخيراً تشير النتائج الى ان زيادة ملوحة التربة قد ادت الى اعطاء اعلى زيادة لمستوى حمض الايروسيك الضار فى الزيت
ومن النتائج السابقة يمكن لنا توصية منتجى المحاصيل الزيتية بامكانية زراعة نبات الكانولا فى الاراضى المصرية عندمستوى ملوحة اقل من ٠.٩% لاعطاء اعلى قيم لقياسات النمو الخضرى والمحصول البذرى ونسبة الزيت.