

## Screening of a Number 8 Rape Flower Cultivars Based on the Accumulate Osmoticum to Salt Tolerance

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### ABSTRACT

Sodium chloride at 100 and 200 mM reduced seedling growth in sensitive cultivar more than tolerance one. Ascorbate peroxidase activity in shoots decreased in tolerance but increased in sensitive cultivar. Increasing NaCl concentration, first decreased guaiacol peroxidase activity in both cultivars but increased afterward. Proline content increased at 200 mM NaCl but the differences between the two cultivars were not significant. Soluble sugars decreased in both cultivars. Sodium absorption increasing in both cultivars with increase in NaCl and decrease in KCl, but sensitive cultivar absorbed more sodium than tolerant cultivar. In contrast, under the same conditions, tolerant cultivar absorbed more potassium than sensitive cultivar.

**Key words:** Rape flower; salt stress; tolerance mechanism  
(proline; Antioxidant enzyme and soluble sugars).

### INTRODUCTION

Salinity stress is the most serious of restricting factors in plant performance crops that are sensitive to salinity among plants are sensitive to salt, resistant to the little amount of salt in soil depends on root ability in preventing of arrival harmful ions to leaves because, the storage of fresh water is supplied from underground water for a great amount, this water is reduced by frequent consumption for drinking and irrigation so, the need to salt and acid (bitter) water, such as sea water, is increased. These explanation, diagnosis and identification of plant cultivars that are resistant to salinity appears more important. In this survey, salinity effects (NaCl) on growth and development and physiological and biochemical responses to salinity stress in canola has been studied. Canola is a name used for rape oil seed. This plant is belong to Brassicaceae

Family (64) vegetative form generally is non-woody, alternative leaves, cluster flower and regular flowers, this plant has fruits in the form of silique<sup>4</sup>.

Rape has third rank after soybean and cottonseed. In comparison to soybean that has 20% oil and 40% protein, canola has 40% oil and 23% protein (75) chemical compounds in rape in each gram, the leaf has 3.83 gr water, 2.9 gr protein, 1.7 gr lipid, 11.2 hydrocarbon, 1.8 fiber, 136 mg calcium, 38 mg phosphor 4.6 mg Fe, 0.08 thiamin.

In about medical characteristics, has been said that seed powder of this plant is used for cancer and its ointment is used to treat chronic coughing (26). Canola oil with low level of saturated fatty acid and the great amount of unsaturated fatty acid such as oleic acid, in amount of 61 percent, has demonstrated that this oil is effective in reducing

cholesterol and harmful lipid in blood(LDL)<sup>5</sup>. fall and spring types are available . the spring ones include hayola(3.8),PF,Hayola(401) cultivars . fall ones include ,Talaie ,kelver+and Ecap. Hayola(308) is one of hybrids that has very large seed. This hybrid has been originated from Canada .rape is one of the most resistant plants against salinity .special characteristics and its adaptation to weather condition in almost places in country,result in development of this culture become point hope in supplying raw edible oil<sup>2</sup>. So that its necessary to identify the varieties of rape that is more resistant to salinity , in order to increase this crop.

### MATERIAL AND METHODS

1. The seeds of four cultivars were supplied from agriculture research center in Borazjan. Before application , the seeds were disinfected.

By HClO for 10 minutes and after several washings, were used in different experiments. cultivars used in these experiments , include:

1. Hayola 401
2. Hayola 308
3. Talaie

- 1 Preparation of solutions needed in this experiment, we used NaCl solution in concentrations,0,25,50,75,300,200,100(Milli Molar)
- 2 Treatment method: first the seeds were disinfected then 15 uniforms has been placed on disinfected Petri dish on two layers of filter puper. To each Petri dish ,smm. Solution of prepared solutions was added and then dishes contained seeds were placed in windy incubator in 23+/-1 c in dark for 3 days then the number of seeds that are emerged and root length were accounted each treatment unclude,3 repetition and in control group(without NaCl) , we used distilled water.

The effect of HCl on vegetative growth in seeds. In these experiments, we used perlite culture with hogland liuid.

### As a base nutrition medium

#### Application method

Disinfected seeds were distributed evenly

on special bucket placed in dishes contained water and then were stored in temperature condition in experiment. After emergence , the dishes were transformed to culture room and exposed on florescent light, with 6000 loux intensity and this light period: 16 h in light and 8h in dark.7-day plantlets were transformed to dishes contained perlite +Hogland

The aime of this test,selection of the most resistant and sensitive cultivar to salinity stress.after this test the following tests were done on these (two cultivars) cultivars.

The effects of Macl treatment on Ascorbat peroxide enzyme activity extracted from leaves and root of hayola and talaie's plantlet.

### Necessary material and solutions

In this test we has used 0.1 molar phosphate solution with PH=1 , 10 mili molar EDTA , 2.2 and 22 mili molar Ascorbat and 0.03 molar H<sub>2</sub>O<sub>2</sub> solution.

### Plant preparation

after seed culture we used 14 day plantlet in order to extract peroxide ascorbat enzyme.

The extraction of peroxide ascorbat enzyme first,plantlets were washed by distilled water and dried by facial tissues. Leaves and roots were separated from each other and 150 miligram of root tissues and 250 miligram of leaf tissues were weighted and separately were homogenized. Homogenized solution include,umili litter phosphate buffer 0.1 molar with plt=7 and 0.5 ascorbat solution 22 mm and 0.5 mililit EDTA 90 mili molar.

The reduction of light absorbtion in 290 nm legth wave in 5 second interval for 1 minute by means of spectrophotometer was measured and changes in light absorbtion relative to time were determined.

The effects of treatment NaCl on peroxide gayakol peroxide enzyme activity entracted from plantlet of leaves and root.

### Necessary Materials and solutions

In this experiment ,we used H<sub>2</sub>O<sub>2</sub> 0.03

M, phosphate buffer 0.1 Molar pH=7, gayacol solution 0.02 Molar and solid kcl.

The method of treatment : in order to measure peroxide gayacol enzyme, increasing light absorbtion in 437 nm wavelength in 15 seconds interval for 5 minutes was recorded and light absorbtion changes relative to time were determined.

“The effects of Nacl on prolin value in two cultivars”

#### **Necessary materials and solutions**

Nine hydrin solution, acid acetic, phosphoric acid, sulfosalicylic acid 3%, toluene and prolin amino acid.

In order to prepare ninehydrin, 60 milliliter acetic acid was added to 2.5 gram of powder form of this and then 20 milliliter of phosphoric acid 6m was added, resulting solution was stored in refrigerator.

#### **The method of treatment**

Cleaned plantlets were placed in oven for 21 hour, then, 30 milligram of dried root was weighed and 10 milliliter of sulfo salicylic acid %3 was added. after 24 hours, 2 milliliter acetic acid and 2 milliliter nine hydrin was added to resulting solution. Then, tubes are placed into warm bath for 1 hour. after cooling, ycc toloan was added to each tube and was shaken for 20 seconds by vertex set. We could see that two phases were formed. upper phase absorbtion (toloan contained color complex) in 250nm wavelength was measured.

### **RESULTS**

The effect of NaCl on elementary growth in 8 rape cultivars.

Emergence percent and root length in 8 cultivars, talaie (sensitive) and hayola 308 (resistant) was identified.

The effect of Nacl on emergence in rape cultivars.

Big letter in each row and small letter in each column are different according to duncken

test has significant difference  $\alpha=5\%$

The effect of Nacl on emergence percent in 8 cultivars. In 25 to 100 millimolar Nacl, hayola cultivar has more emergence percent than talaie cultivar in  $\alpha=5\%$  have significant reduction relative to control.

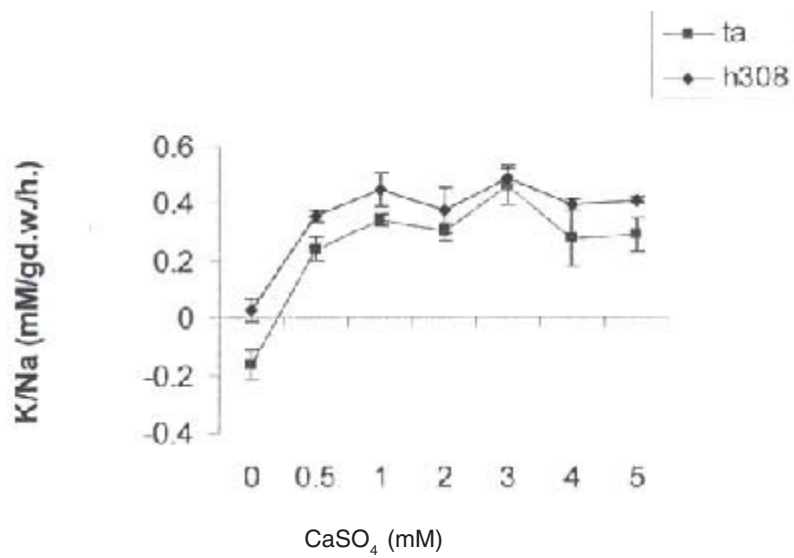
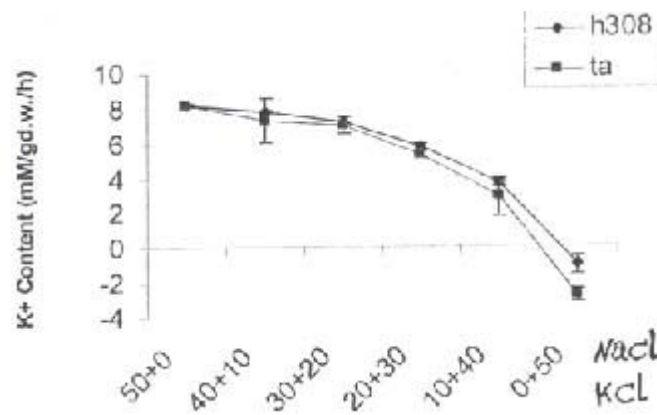
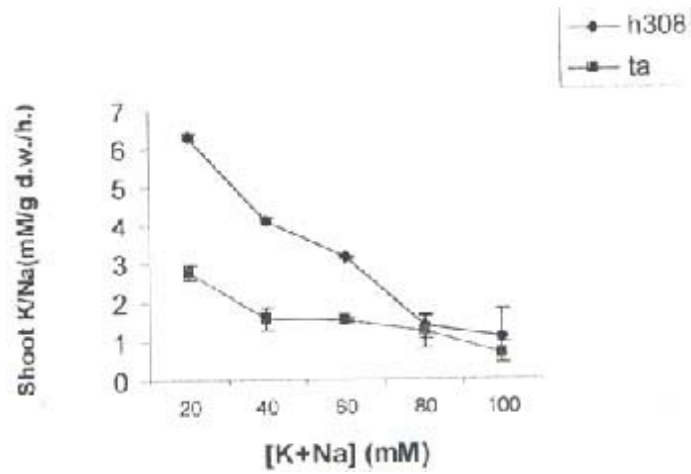
The effect of salinity on root length in rape cultivars: results are illustrated in following table. In 25 millimolar NaCl, root length moderate in all cultivars showed significant reduction in relative to controls. Except, in hayola cultivar that we saw rootlet increasing. reduction in root growth and rootlet length in talaie cultivar was significant ( $\alpha=5\%$ ). In 200 and 300m molar Nacl, all cultivars showed significant reduction relative to lower concentrations and control groups.

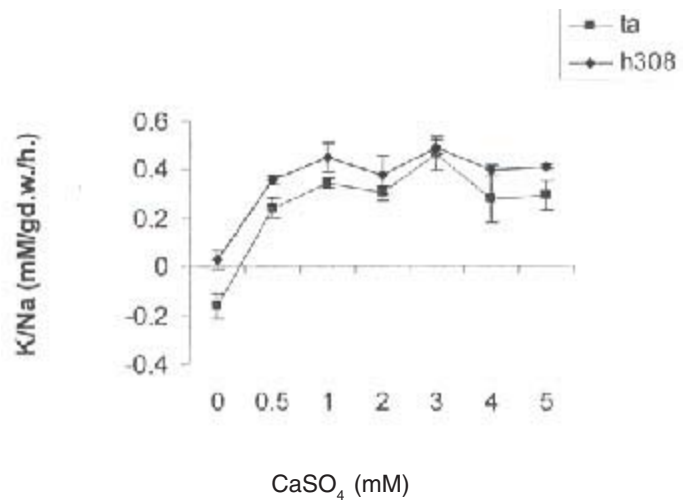
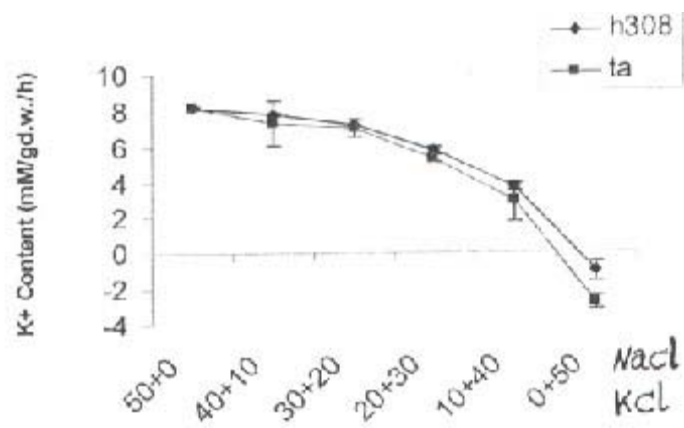
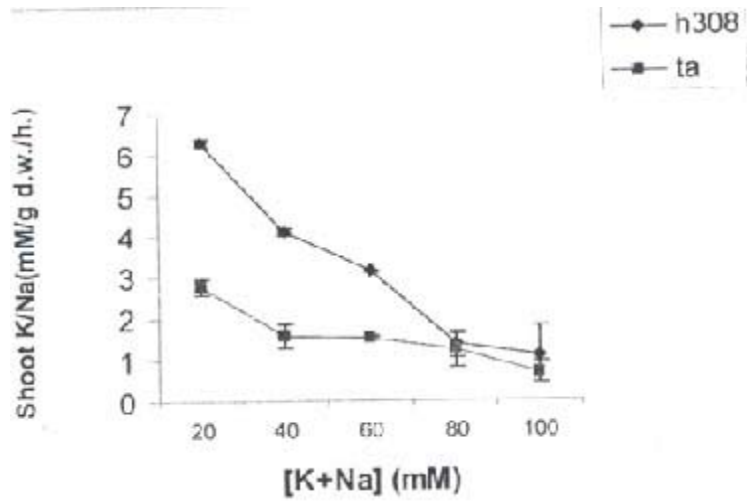
#### **To lower concentrations and control groups**

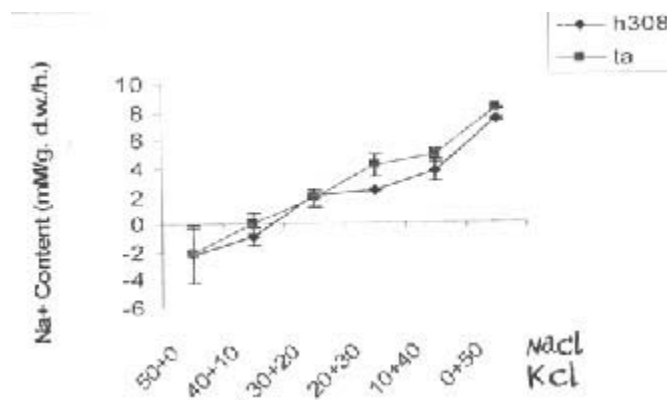
The comparison of root dry weight in resistant plantlet to salinity: the moderates of root dry weight in resistant cultivar (h3o8) in 100 and 200 concentration of Nacl relative to control group was reduced and this reduction was not significant ( $\alpha=5\%$ ). In sensitive cultivar (Ta), moderate of root dry weight in 100 and 200 m mol Nacl showed significant reduction relative to control group.

The effect of salinity on enzyme activity (peroxide ascorbat) that is extracted from root plantlet of sensitive and resistant cultivar: by increasing in salt concentration, enzyme activity in both cultivar has been decreased. In 100 mmol enzyme activity in  $H_2O_2$  has not any difference with control group, however, in 200 mmol, enzyme activity was decreased about 22.5 percent. in talaie cultivar, enzyme activity in 100 and 200 mmol has been decreased about 41.3% and 37.8% in relative to control group (respectively)

The effect of salt on enzyme activity of peroxide gayacol extracted from root and leaf of sensitive resistant cultivar. Enzyme activity in leaf, in 100 mmol concentration in both cultivars, showed reduction relative to control group, however, in 200 treatment in hayola cultivar, enzyme activity has been increased about 14.4% relative to control group, and in talaie cultivar, this has been decreased about 8.7% in relative to control group. in root, in







both cultivar (sensitive and resistant) has seen that enzyme activity was increased by concentration increase. In hayolar cultivar, in 200 and 100 treatment, enzyme activity has been increased about 68% and 38% in comparison to control group (respectively), however in Ta cultivar, in 100 and 200 treatment, enzyme activity has been increased about 10.3% and 20.77% (respectively).

The effect of salinity on proline value extracted from root of sensitive and resistant

cultivar: the amount of root proline in hayola cultivar control group was about 1.47 mmol proline in each gram of root fresh weight. In 200 mmol treatment, this amount was arrived to 19.35 mmol/gram, this means that the amount was increased about 92.4% relative to control group. In talaie cultivar, control group has shown is mmol/gr proline in each gram of fresh weight, in 200 mmol treatment the amount of root proline has been reached to 25 mmol/gr, this means that we could see an increase about 94% in comparison to control group.

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