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Hydrodictyon algae Extract on Germination and Effect of Growth of Seedlings of Wheat and Barley Plants under Salinity Stress and Chemical Study for it

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ABSTRACT

This study to specialize about effect of salinity on growth wheat and barley plant era won variety during germination stage and seedling growth and study of role algae extract *Hydrodictyon* algae in the effect on that plants under salinity stress. to choose category as category from categories wheat plant for study. to assessed of concentrations 0, 50, 100 m mol from solution NaCl. to assessed of concentrations 0, 0.05, 0.1 g/100 ml from algae extract *Hydrodictyon* algae for process experimental plants. to used measurements of growth as indicator for plants response for salinity process and algal extract is germination percentage, elongation of plumules and rootlet, percentage of water content and determination proline acid. The results indicated that salinity have negatively influent on most of used measurements. process barley and wheat plants with *Hydrodictyon* algae extract and interactive its effect with salinity to lead to over incorporeal high in most of used measurements as indicator for over resistance this plant for salinity with process algae extract. according to results of study and compare from other studies in this connection, that we to lead to process barley plants with *Hydrodictyon* algae extract for help of plant in resistance salinity stress.

KEYWORDS: *Hydrodictyon* algae, resistance, stress

ARTICLE DETAILS

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INTRODUCTION

A considerable amount of our daily carbohydrates and proteins is contributed by both species. Cereals and bread are the major source of energy for all age groups, providing 30 % for adults in developed countries, while it can be up to 80% in developing countries (1). Despite their global importance for food security and supply ,yield gains of wheat and barley have remained rather moderate or stagnant within the last two decades ,specifically in the high-yielding areas of the world such as Europe (2). Clearly ,this alarming trend has to change, to ensure that future projected food demands can be met in a sustain able manner (3)

Cereal crops, such as wheat and barley, are usually grown as monocultures infields or strips to enable synchronized maturation and combine harvesting .Dense stands of kin plants in a canopy are there for the preferred growth situation(7-9). The canopy architecture of cultivars is hence a decisive feature of how plant scope with inter-plant competition. While, for example ,shade-avoidance responses in cereal crops are hardly understood, the development of so-called“ cooperative plant communities ”with improved yield potential is still far from being realized (4;5). As leaf and tiller development are pivotal aspects of can copy and shoot architecture (10). Cereal grain production: Barley is a cool-season annual grass that produces grain for human and animal consumption. Because there are both summer and winter varieties, barley can be grown at a wide variety of locations. It ranks fourth in terms of world grain production behind maize (Zea maize L.), wheat (Triticum aestivum L.), and rice (Oryza sativa L.) (11). In the United States, barley grain is used primarily as a high-protein additive to livestock feed for cattle, sheep, pigs, and poultry. An estimated 25% of barley grain production in the United States is used to make malted beverages such as beer (12). This crop is one of the only cereal crops that can withstand high elevations and short growing seasons, and is an important food staple for humans in the Andes mountains of Peru and the high plateaus of Tibet(7).

Algae are considered autotrophic thallus plants, they do not have roots, stems, leaves, or conductive vessels, and they are widespread. The algae were used as food as well as forage

and fertilizer. In the field of agriculture, man used algae to fertilize the soil(9, 13).

MATERIALS AND METHODS

- **Preparation of algae extract *hydrodictyon* algae**

The algal extract was prepared using dried powder of *hydrodictyon* algae by preparing two different concentrations of 0.1 and 0.05 mmol.

- **Prepare the saline solution**

The saline solution was prepared using pure NaCl salt according to what was described (18) by preparing two different concentrations: 50 and 100 mmol.

- **The plants used in the study**

Grains of barley and wheat were brought from the Grass family from the Agricultural Research Center

- **Grain preparation for study**

Petri dishes (9 cm in diameter) with filter paper (1) were used. Sterile, 10 barley grains were placed in each dish and three replicates were used for each experiment. Each dish was placed 10 ml of distilled water or two concentrations of saline solution or two concentrations of the interaction solutions between the algal extract and the saline solution. The dishes were incubated in a JENWAY- 3505 incubator at 25°C for 7 days. The percentage of germination in each dish was estimated according to the following equation described by (19):

Germination percentage = (germinating seed number) / (total seed number) x 100

On the seventh day, the cultivars were counted, then the lengths of the roots and stalks of all seedlings in each dish were measured using a ruler and the lengths were determined in centimeters (cm). The average measurements were taken for each iteration, then the fresh weight of the seedlings was determined, then the seedlings were dried in an electric oven for 42 hours at a degree

RESULTS AND DISCUSSION

The study showed, according to Table No. (1), that the percentage of germination gave the highest rate in saline concentration (50 mmol), while the average length of Rusha and rootstock was in distilled water, while wet weight gave the highest rate in distilled water, while dry weight gave the highest rate in saline concentration (100 mmol). While the lowest rate of germination was in saline concentration (100 m mol), while the length of the rootstock and rootstock was the lowest rate in salt concentration (100 m mol), while the wet weight was the lowest rate in the saline concentration 100 m mol, while the dry weight was the lowest rate in the concentration Saline (50 m mol).

Table No. (1) Effect of different levels of salinity on wheat germination

wet weight g	dry weight g	Radicle length cm	plmula cm	Germination percentage	Parameters
0.06	0.4	3	2.5	3	Distilled water
0.1	0.3	1.5	2	3	Salt concentration 50 mmol
0.11	0.2	1	1	2	Salt concentration 100 mmol
0.03	0.03	1.4	1.1	0.2	LSDP-0.05

The current study was explained according to Table (2).

The percentage of germination gave the highest rate in algal extract concentration 0.05 as well as in distilled water, while the length of the rootstock and rootstock gave the longest rate in algal extract concentration (0.05), while the wet weight the highest rate was in distilled water and algae extract at concentration (0.05), while the dry weight was higher The average was in the algal extract. The lowest rate of germination was in the algal extract, a concentration of 0.1, and the length of the feather was the lowest in distilled water, while the root length ratios were close, while the wet weight was the lowest rate in the algae extract, at a concentration of (0.1) while the dry weight was the lowest rate in the distilled water. .

Table No. (2) Effect of treatments with hydrodictyon algae extract on wheat germination

wet weight g	dry weight g	Radicle length cm	plmula cm	Germination percentage	Parameters
0.06	0.4	3	2.5	3	distilled water
0.9	0.4	3	3	3	Algae extract 0.05
0.12	0.3	3	2.5	2	0.1 . algae extract
0.05	0.4	0	0.3	0.2	Lsdp<0.05

The current study showed, according to Table (3), that the percentage of germination gave the highest rate in algae extract 0.05 with saline solution (50 mmol), as well as in distilled water, while the length of the feather gave the longest

rate in algae extract 0.05 with saline solution (50 mmol), while Root length gave the longest rate in distilled water, while wet weight had the highest rate in distilled water as well as in algae extract 0.05 with saline solution (50 mmol), while dry weight gave the highest rate in algae extract 0.05 with saline solution 100 mmol. The lowest rate of germination was In 0.05 algae extract with 100 mmol saline solution ., While the lowest mean of feather and root length was in algae extract 0.05 with 100 mmol saline solution, while the lowest average was 0.05 in algae extract with saline 100 mmol while the dry weight was lowest in 0.05 algae extract with 100 mm saline solution.

Table No. (3) The effect of treatments of hydrodictyon algae extract at a concentration of (0.05) with different levels of salinity on the germination of wheat

wet weight g	dry weight g	Radicle length cm	Plmula cm	Germination percentage	Parameters
0.06	0.4	3	2.5	3	Distilled water
0.11	0.4	2.5	3.5	3	Algae extract 0.05 with brine 50 mmol
0.10	0.3	1	2.5	2	Algae extract 0.05 with 100 mmol brine
0.03	0.05	1.2	0.8	0.2	L s d p < 0.05

The current study, according to Table No. (4), showed that the percentage of germination gave the highest growth rate in 0.1 concentration algae extract with saline solution (50 mmol) as well as in distilled water, while the length of the droplet gave the longest rate in 0.1 concentration algae extract with saline solution (50 mmol). While the longest average root length was in distilled water, while the wet weight ratio was close, while the dry weight, the highest rate was in algal extract of 0.1 concentration with 100 mmol saline solution, while the lowest rate of germination was in algal extract of 0.1 concentration with 100 mm salt solution. mol, while the length of the rotis and the rootstock was the lowest average length of 0.1 concentration algae extract with 100 mmol brine, while the wet weight was close, while the dry weight was the lowest average length in distilled water

Table No. (4) Effect of treatments of hydrodictyon algae extract at concentration (0.1) with different levels of salinity on wheat plant

wet weight g	dry weight g	Radicle length cm	plmula cm	Germination percentage	Parameters
0.06	0.4	3	2.5	3	**Distilled water**
0.09	0.4	2.5	2.5	3	**Algae extract 0.1 concentration with 50 mmol brine**
0.11	0.4	2	2	2	**Algae extract 0.1 concentration with 100 mmol brine**
0.03	0	0.5	0.04	0.2	Lsdp < 0.05

The current study, according to Table No. (5), showed that the percentage of germination was high in the different salinity concentrations, while the lengths of the rootstock and the lengths of the roots were the highest in distilled water and in saline solution at a concentration (50 mmol), as well as for the fresh weight. As for the dry weight, the percentages were close to what Except for the salt concentration (50 mmol), the highest dry weight average was 0.4 .

Table No. (5) The effect of different levels of salinity on the germination of barley plant

wet weight g	dry weight g	Radicle length cm	Plmula cm	Germination percentage	Transactions
0.3	**0.9**	**5**	**3**	**6**	Distilled water
0.3	**0.3**	**3**	**1**	**8**	Salt concentration (100 mmol)
0.3	**1.1**	**4**	**3**	**8**	Salt concentration (50 mmol)

And as in Table No. (6), the percentage of germination was high in distilled water and the concentration of the extract was (0.05), while the length of the feather was the highest in the distilled water and the concentration of the extract was (0,1) and the length of the root was the highest in the distilled and extracted water. With a concentration of (0.05), as for the

fresh weight, the highest rate was in the distilled water, and the dry weight was the highest rate in the extract concentration (0.05).

Table No. (6) The effect of treatments with hydrodictyon algae extract on the germination of barley plant

wet weight g	dry weight g	Radicle length cm	Plmula cm	Germination percentage	Transactions
0.3	**0.9**	**5**	**3**	**6**	Distilled water
0.3	**0.9**	**4**	**2**	**5**	0.1 . algae extract
0.3	**0.9**	**3**	**2**	**7**	Algae extract 0.05

The current study also indicated, according to Table No. (7), that the percentage of germination was the highest in the distilled water, as for the fresh weight, the lengths of the ruesha and the rootstock, the highest rate was in the distilled and extracted water at a concentration of (0.05) with a saline solution (100 mmol), while the dry weight The proportions were close.

Table No. (7) The effect of treatments of *hydrodictyon* algae extract at a concentration (0.05) with different levels of salinity on barley germination

wet weight g	dry weight g	Radicle length cm	plmula cm	Germination percentage	Transactions
0.3	**0.9**	**5**	**3**	**6**	Distilled water
0.3	**0.8**	**4**	**2**	**5**	Algae extract 0.05 with 50 mmol brine
0.3	**0.9**	**6**	**3**	**6**	Algae extract 0.05 concentration with 100 mmol brine

This study indicated, as in Table No. (8), that the percentage of germination was high in the concentration of the extract (0.1) with different salinity concentrations, while the lengths of the rotis had the highest rate in the distilled water and the root lengths were the highest in the distilled water and the concentration of the extract was (0.1) with Saline solution (50 mmol), as for the fresh weight, the highest rate was in distilled water and extracted at a concentration (0.1) with saline solution (100 mmol).

Table No. (8) Effect of treatments of *hydrodictyon* algae extract at concentration (0.1) with different levels of salinity on barley germination

wet weight g	dry weight g	Radicle length cm	plmula cm	Germination percentage	Transactions
0.3	**0.9**	**5**	**3**	**6**	Distilled water
0.3	**1**	**5**	**2**	**8**	Algae extract 0.1 concentration with brine 50 m mol
0.3	**1**	**4**	**2**	**6**	Algae extract 0.1 concentration with 100 m mol brine

CONCLUSIONS AND RECOMMENDATIONS

The ability of the plant to tolerate salinity and drought is related to its ability to accumulate proline acid in its tissues when exposed to these conditions, and that treatment *hydrodictyon* with extract has increased the ability of wheat and barley seedlings to increase the content of proline acid and thus enabled them to withstand conditions of low osmotic effort even at high levels. high salinity .

According to the summary, we recommend farmers in the field of growing wheat and barley plants to treat it with

hydrodictyon algae extract to help the plants resist salinity stress.

REFERENCES

I. Shewry PR, Hey SJ .(2015). The contribution of wheat to humandiet and health.Food Energy Secur4: 178–202
II. Ray DK, Ramankutty N, Mueller ND, West PC, Foley JA .(2012). Recent patterns of crop yield growth and stagnation.NatCommun3: 1293
III. Tilman D, Balzer C, Hill J, Befort BL .(2011). Global food demandand the sustainable intensification of agriculture. ProcNatl Acad Sci USA108: 20260–20264
IV. Donald CM .(1968). The breeding of crop ideotypes.Euphytica17: 385–403
V. Denison RF .(2012). Darwinian Agriculture: How UnderstandingEvolution Can Improve Agriculture. Princeton UniversityPress, Princeton and Oxford
VI. Shaaf S, Bretani G, Biswas A, Fontana IM, Rossini L .(2019). Genetics of barley tiller and leaf development.J IntegrPlant Biol61: 226–256
VII. Kawther K Abd Alrudhe , Hawraa G Hussein Salim. (2024). Study of the effect of salt stress and gibberellin on some growth characteristics of Vinca rosea., Journal Alharf ., No. 20 .,February 2024
VIII. Altaef Al tikriti, A. hossen . (2024). Comparative Efficacy of Madrid Plant Extracts in Controlling Red Flour Beetle Populations: A Laboratory Evaluation of Alcohol and Aqueous Solutions . International Journal of Pharmaceutical and Bio Medical Science, 4(2), 64–71. https://doi.org/10.47191/ijpbms/v4-i2-05
IX. Carena, M.J. (2009). Handbook of plant breeding: cereals. 1st ed. Springer, New York.
X. Euis Nia Setiawati, Wasis Sarjono. (2023). Description of White Blood Cell Difference and Health at Various Levels of Batur Sheep Prolification., International Journal of Scholarly Research in Biology and Pharmacy.,2023, 02(02), 027–036 ., DOI: 10.56781/ijsrbp.2023.2.2.0022
XI. Christopher IfunanyaChukwu, Rhoda Nwalozie, RoseMary Kaiso Esiere, Brenda Anyakwe Nnokam.(2023).Current Trend in Proteomics in Nigeria: Infectious Disease.,Journal of Biomedicine and Biosensors, Volume : 3, Issue: 4, Pages: 16 – 28., https://doi.org/10.58613/jbb343
XII. Nadya J. Ibraheem, Mays U. Hashim, Ahmed F. Farhood, & Zainab A. Radhi. (2024). Synthesis of Phenylethanoid Nanoparticle and Study of Its Antibacterial Effect. International Journal of Pharmaceutical and Bio Medical Science, 4(2), 59–63. https://doi.org/10.47191/ijpbms/v4-i2-04
XIII. Davison, J., B. Schultz, and A. Widaman. 2012. Malting barley in Nevada. Univ. of Nevada Cooperative Extension Fact Sheet. FS-01-47. Reno. http://www.unce.unr.edu/publications/files/ag/2001/fs0147.pdf (accessed 7 Aug. 2012).
XIV. Bold, H. and Wynne, M. (1985): Introduction to the algae. Second edition. Library of congress cataloging in publication data. PRENTICE-Hall. 662.
XV. Tamiya. H. (1959): Role of algae a food. Agric. Indian Counc. 383-388.