بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

ALLEVATING THE IMPACT OF SALINTY STRESS ON MAIZE PLANTS USING SOME ANTIOXIDANTS

Submitted By

Maha Abdel Fattah Ibrahim Dekhil

B.Sc. of Agricultural Science, Faculty of Agriculture, Cairo University, 2013

A Thesis Submitted in Partial Fulfillment
Of
The Requirement for the Master Degree
In
Environmental Sciences

Department of Environmental Agricultural Sciences
Institute of Environmental Studies and Research
Ain Shams University

2021

APPROVAL SHEET

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ABSTRACT

Maha Abdel Fattah Ibrahim Dekhil, Alleviating The Impact of Salinity Stress on Maize Plants using some Antioxidants, Unpublished M. Sc. Thesis, Agricultural environment Science, Inst. of Environ. Studies and Res., Ain shams univ.2021.

The effect of five foliar applications [α-tocopherol (25 and 50 ppm) and selenium, Se, (Na_2SeO_4 at 2.5 and 5 µM), in addition to the control treatment)] on maize plants cv. Giza 310 irrigated with three concentrations of saline water (0, 50 and 100 mM NaCl) were investigated. Our findings revealed that the treatment of 2.5 µM Na_2SeO_4 achieved the highest significant increases in leaf area, leaves fresh weight, stem fresh weight, total shoot fresh weight, leaves dry weight, stem dry weight and total shoot dry weight, as well as, leaf relative water content under different tested levels of salinity. Application of 25 ppm α tocopherol led to the highest significant increases in Chl a, Chl b and carotenoids under different investigated levels of salinity. Application of 25 ppm α tocopherol and 2.5 µM Na_2SeO_4 gave the lowest significant values of Na^+ and Na^+/K^+ ratio compared to the other treatments under different levels of salinity. The treatment of 2.5 µM Na_2SeO_4 under 100 mM NaCl resulted in the highest significant values in the activity of POD and PPO compared to the other treatments.. Application of 25 ppm α tocopherol achieved the highest significant increases in the ear weight/plant, weight of grains/ear and weight of 100 grains compared to the other treatments. The treatment of 2.5 µM Na_2SeO_4 or 25 ppm α tocopherol under non saline conditions achieved the highest significant grain viability.

Key words: Maize, growth, salinity, α–tocopherol, selenium, leaf relative water content, Antioxidant enzymes.

List of Abbreviations

FAO	Food and Agriculture Organization
ROS	Reactive oxygen species
Se	Selenium
Toc	α-tocopherol
dS/m^{-1}	deciSiemens per metre
mS/cm	milliSiemeus per centimeter
MPa	Mega Pascal
mM	milliMolar
µM	microMolar
Ppm	parts per million
ECi	Electrical conductivity of water
ECs	Electrical conductivity of soil solution
ECe	Electrical conductivity of saturated soil paste extract
LRWC	Leaf relative water content
Chl a	Chlorophyll a
Chl b	Chlorophyll b
CRBD	Completely randomized block design
POD	Peroxidase
PPO	Polyphenol oxidase
FW	Fresh weight
DW	Dry weight
TW	Turgid weight
DAS	Days after sowing

Contents

List of Table