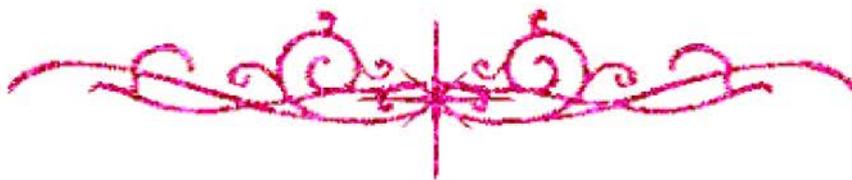


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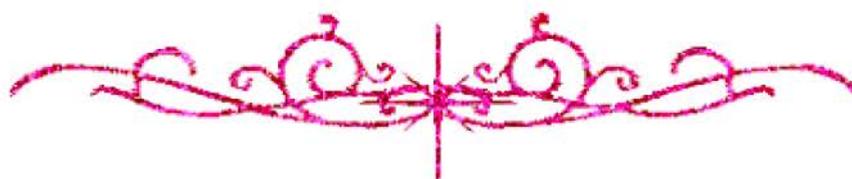
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شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

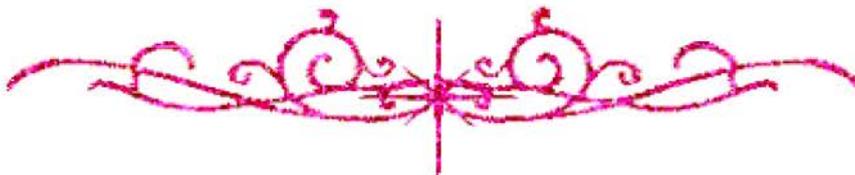
قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغييرات



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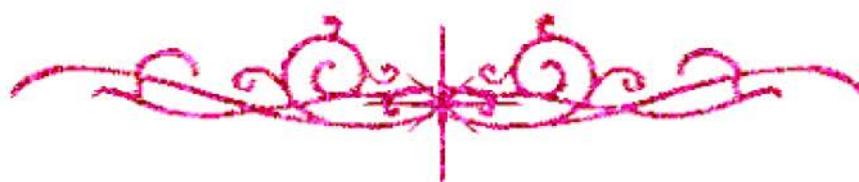
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بعض الوثائق الأصلية تالفة



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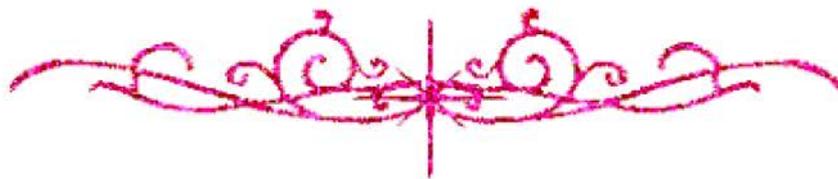


شبكة المعلومات الجامعية



بالرسالة صفحات

لم ترد بالأصل



8154E1

**RESPONSE OF PROPOLIS EXTRACT-
PRESOAKING SEEDS OF SOME CROPS
TO SALT TOLERANCE UNDER
DIFFERENT SOIL CONDITIONS**

A Dissertation
Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy
In
Agricultural Science
(Plant Physiology)

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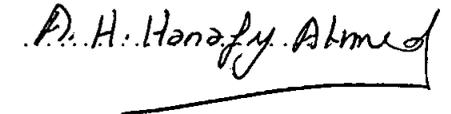
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ABSTRACT

This investigation was conducted during the seasons of 1999/2000 and 2000/2001 at the Experimental Area of Faculty of Agriculture, Fayoum, Cairo University, to study the effect of propolis extract seed/grain presoaking on germination and chemical composition of treated seeds/grains (in a laboratory study) of sugarbeet (cv. Nour), wheat (cv. Sakha 8), maize (cv. Trihybrid 310) and sorghum (cv. Giza 15) as well as emergence, growth, yield and its components and chemical composition of different parts (roots, stems and leaves) of the above mentioned crops sowing in clay and calcareous soils (in a pot study).

Propolis used in this study was prepared to obtain propolis extract (PE) at the concentration of 5% which used either non-salinized or salinized with NaCl salt till the concentration of 3000 ppm for soaking seeds/grains before sowing for 6 or 12 hrs. Treatments comprised nine classes for the laboratory study and seven classes for the pot study.

In the pot study, vegetative growth parameters of previously mentioned crops were recorded at different sampling times (30, 60 and 90 days after sowing for sugarbeet and wheat, while 25, 50 and 75 days after sowing for maize and sorghum).

The obtained results are tabulated as a mean of the two successive seasons and could be summarized as follows:

Regarding laboratory study, seed/grain germination%, germination rate index, the concentrations of total sugars, free proline, total free amino acids, total soluble phenols, gibberellins, indole acetic acid and nucleic acids (DNA, RNA and total nucleic acids) as well as the activity of α -amylase were significantly increased with seeds/grains under different applied treatments as compared to untreated seeds/grains. The highest values of all previous mentioned parameters were recorded with soaking seeds/grains in propolis extract.

Concerning pot trial, emergence%, growth parameters and yield and its components of all crops under study as well as the concentrations of indoles in stems and leaves, nucleic acids (DNA, RNA and total nucleic acids) in different plant parts and leaf pigments (Chl. a, Chl. b and total carotenoids) and the activity of leaf α -amylase were significantly increased while, the concentrations of total sugars, free proline and total free amino acids of different plant parts and roots indoles as well were recorded the contrary with clay soil as compared to calcareous soil. All previous mentioned parameters scored the highest values with soaking seeds/grains in propolis extract, with some exceptions, as well as with combination between soaking seeds/grains in propolis extract and clay soil irrigated with tap water, with some exceptions, with considering that combination between soaking seeds/grains in propolis extract or NaCl-salinized propolis extract and calcareous soil exhibited good results.

Finally, in view of the obtained results, seed/grain germinability, growth and yield and its components as well as chemical composition of plants could be notably improved under saline conditions by the appropriate propolis extract seed/grain presoaking for suitable periods proportional to every crop seeds/grains.

Key words: Propolis, Salinity, Germination, Growth, Yield, Chemical composition, Sugarbeet, Wheat, Maize, Sorghum.

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INTRODUCTION

Introduction

Salinity stress is being one of the great challenges in agriculture and has been the subject of intensive research. Soil salinity, especially in dry lands, causes great losses to agriculture by the reduction of vegetative growth, yield and its components of various crops and also causes productive land to be withdrawn from agriculture (**Staples and Toenniessen, 1984 and Hassan *et al.*, 1999**). The ever increase demand for agricultural products requires a reassessment of the production potential of low quality and water resources specifically, increased plant tolerance of saline and other poor water quality will be of great importance (**Epstein *et al.*, 1980; Hassan *et al.*, 1999 and El-Masry and Hassan, 2001**).

Egypt is located in the arid zones and agricultural lands depend mainly on Nile water which has a remarkably good quality. The increasing demand on water for reclaimed lands raised the necessity of using the saline water either from wells or from drains as a source for irrigation.

Hence, new approaches to agricultural production in salted affected regions are needed to bridge the gaps between today's approach and a future of agriculture that uses genetically improved plants.

In recent years, increasing interest has been focused on alleviation of salinity stress by application of some natural products to plants grown under saline conditions as a possible tool for minimizing the suppressive effect of salinity on plants.

Propolis or "bee glue" is a well-known natural substance that beekeepers find it in their hives filling the cracks and considered to be effective against a variety of bacteria, viruses, fungi and moulds.

Several investigations (**Ghisalberti *et al.*, 1978; Nikolaev, 1978; Walker and Crane, 1987; Crane, 1990; Abd-El-Hady and Hegazi, 1994**

and Bankova and Popov, 1997) were conducted to identify the chemical composition of propolis. These investigations revealed that, propolis contains several important compounds which effective in the activity of many physiological processes in plants. From these compounds, amino acids, sugars, vitamins (esp. B-group), minerals (as promoters for metabolic pathways) and terpenes and sesquiterpenes which considered to be precursors of many phytohormones (i.e. GAs, ABA, etc.) which their role didn't negate in the physiological processes in plants.

Despite the importance of propolis as a therapeutic agent for many diseases, studies on its effect on growth and chemical changes in plants are very rare.

Thus, the aim of the work embodied in this study is to investigate the effect of propolis extract seed/grain presoaking on germination, growth, yield and chemical composition of some crops grown under saline conditions of two soil types (clay and calcareous) in an attempt to identify the role of propolis extract in minimizing the deleterious effects of salinity on the selected crops (sugarbeet, wheat, maize and sorghum).

REVIEW OF LITERATURE