EFFECT OF FARM WASTES AND TOWN REFUSE COMPOSTS WITH BORON APPLICATION ON SUGAR BEET PRODUCTION UNDER ENVIRONMENTAL CONDITIONS OF SOIL AND SALINE WATER AT RAS SUDR, SOUTH SINAI

Submitted BY

Asha El- Sayed Abd El-Nabi

B. Sc. of (Plant production), Faculty of Agriculture, Menoufiya University, 1988

Diploma of Environmental Sciences, Institute of Environmental Studies & Research

Ain Shams University, 2002

M. Sc. of Environmental Sciences, Institute of Environmental Studies & Research

Ain Shams University, 2009

A Thesis Submitted in Partial Fulfillment

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This thesis Towards a Doctor of Philosophy Degree in Environmental Sciences Has been Approved by:

Name Signature

1- Prof. Dr. Ezzat Mohamed Soliman
Pro. of Soil & Water in Department of Environmental Agricultural Science, Institute of Environmental Studies & Research Ain Shams University.

2- Prof. Dr. Mohamed AL-Asmar EL-Hawary
Prof. of crop production & physiology, Fac. of Agric., Al-Azhar Univ., Cairo.

3- Prof. Dr. Hamed Mabrouk El-Kouny
Head of research, in Institute of Soil, Water and Environment, Agricultural Researches Center

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Asha El- Sayed Abd El-Nabi Mohammed

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Under The Supervision of:

1**- Prof. Dr. Ezzat Mohamed Soliman**

Pro. of Soil & Water, in Department of Environmental Agricultural Science, Institute of Environmental Studies & Research Ain Shams University.

2- Dr. Mona Metwaly Abaas Hammada

Lecturer of Environmental Pollution Unit, Plant Ecology and Ranges Department, Desert Research Center

2015

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ABSTRACT

Two field experiments were done in the two successive winter seasons of 2011/2012 and 2012/2013 in the experimental farm of the Desert Research Center at Ras Sudr, South Sinai Governorate, to study the effect of nine compost production from {animal waste (10, 20 and 30 m^3/fed.), town refuse (10, 20 and 30 m^3/fed.) and plant waste (10, 20 and 30 m^3/fed.} and three rates foliar application of boron (control, 0.4 and 0.6 g/L.) and their interaction on growth, yield and chemical composition of sugar beet. The experiments were laid out in a split plot design with four replications.

The main results obtained were as follow:

1- There were a significant differences in growth characters i.e. leaf area, root length, root diameter and total soluble solids percentage (T.S.5%), root fresh and dry weight / plant, top fresh and dry weight / plant and fresh and dry yield of roots and tops of sugar beet between the tested sources of different compost types during both seasons. The highest values of growth characters and yield were recorded in plants treated with 30 m^3 / fed. animal waste in the first and second seasons. The lowest value was obtained from 10 m3 / fed. town refuse in two growing seasons. There were significant differences in sucrose % , juice purity %, crude protein %, boron mg / kg, zinc mg / kg, copper mg / kg, cadmium mg/ kg and lead mg / kg in roots of sugar beet among the tested sources of different compost types during first and second seasons. In this regard, the highest values of crude protein percentage were recorded in plants treated with 30 m^3/fed. animal waste and the lowest value was attained by using 10 m^3/fed. town refuse in the two seasons. While, the highest value of juice purity % was obtained by using 30 m^3 / fed. animal waste and 10 m^3 / fed. town refuse at the first and second seasons, respectively. The highest values of sucrose percentage and juice purity % were obtained by plants treated with 10 m^3/fed. Town refuse and the lowest value was attained by using 30 m^3/fed. Animal waste in the two seasons. Applying 30 m^3 town refuse / fed. gave the highest value of

boron in the first and second seasons. Application of 30 m^3 / fed**.** town refuse gave the highest value of zinc, cadmium and lead in both seasons, while 30 m^3 / fed from animal waste in the first season and with 30 m^3 / fed from town refuse in the second season gave the highest value of copper.

2- Boron foliar application showed significantly responses in two seasons in respect to leaf area, root length, root diameter, total soluble solids (T.S.5%), root fresh and dry weight / plant, top fresh and dry weight / plant and fresh and dry yield of roots and tops of sugar beet. Increasing boron foliar application from 0 to 0.4 g/L. increased growth characters and yield of sugar beet at the first and second seasons. On the contrary, control treatment (nil boron treatment) gave the lowest value of all growth characters and yield in the first and second seasons. Application of boron fertilizer exerted a significant decrease in sucrose % and juice purity %, but a significant increase in crude protein %, boron mg / kg, zinc mg / kg, copper mg / kg, cadmium mg/ kg and lead mg / kg in two seasons. Increasing boron spraying from 0 to 0.6 g/L. increased all chemical composition in the first and second seasons, except crude protein % (0.4 g/ L. gave the highest value of protein). Also, increasing boron spraying from 0 to 0.6 g/L decreased sucrose and juice purity % in both seasons

3- The interaction between compost types and boron foliar had not significant effect on root length, root diameter, root fresh and dry weight plant, top fresh weight / plant and fresh and dry yield of roots and tops of sugar beet in the two growing seasons. In this respect, the combination of 30 m^3 / fed. animal waste and boron spraying at 0.4 g / L. recorded the maximum values of all growth characters and yields of sugar beet plant in two seasons. The interaction between different compost types and boron foliar had a significant effect on in sucrose %, crude protein %, boron mg / kg, zinc mg / kg, copper mg / kg, cadmium mg/ kg and lead mg / kg in roots of sugar beet plants. This effect was observed in the two growing seasons.

CONTENTS

CONTENTS

LIST OF TABLES

LIST OF FIGURES