







شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها على هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

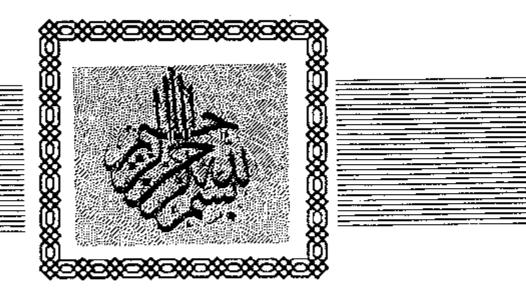
تحفظ هذه الأفلام بعيدا عن الغبار
% ٢٠-٢٠ منوية ورطوية نسبية من ٢٠-٠٠%

To be Kept away from Dust in Dry Cool place of
15-25- c and relative humidity 20-40%



بعض الوثائـــق الاصليـة تالفـة

بالرسالة صفحات لم ترد بالإصل



وقل رب زردنی علما أمندق الك فلعضيهم

EFFECT OF ORGANIC RESIDUES APPLIED TO DIFFERENT SOILS ON SOME PHYSICAL AND CHEMICAL CHARACTERISTICS OF HUMUS DURING THE HUMIFICATION COURSE

By

ELHAM EL-MAGHAWRY NOUR EL-DEIN

B.Sc. " Agric." (Soil Sci.), Menofiya University (1991)

A Thesis

Submitted in Partial Fulfilment of the

Rquirements for the Degree of

M.Sc. in Agricultural Sciences

" Soil Sciences"

Ιn

Agric. Sc. (Soils)

To
Department of Soil Science
Faculty of Agriculture
Menoufiya University

1996

CREDIT SHEET

This M. Sc. Thesis entitled "Effect of Organic Residues Applied to Different Soil on Some Physical and Chemical Characteristics of Humus During the Humification Course" and submitted by Elham E. Nour El- Dein has been supervised by the following staff members of the Department of Soil Science, Foutly of Agriculture, Menouflya University, Shibin ElKom, Egypt:

t- Prof. Dr. Refaat Ahmed H. Khalil.

Proessor of Soil chemistry.

2- Prof.Dr. Mohamed Abo EL-Fadl Ahmed.

Proessor of Soil chemistry.

3- Dr. Badr Yosseif EL - Koumey .

Associate Professor of Soil Science.

Prof. Dr. R. A. H. Khalil: A Hoa El Fadl

Prof. Dr. M. Abo. EL - Fadl: Hoa El Fadl

Dr. B.Y. EL- Koumey: Fall Kallman

APPROVAL SHEET

Title of Thesis: "Effect of Organic Residues Applied to Different Soils on Some Physical and Chemical Characteristics of Ilumus During the Humification Course"

Submitted To: Department of Soil Science, Faculty of Agriculture, Menoufiya University, Shibin EIKom, Egypt.

By: Elham EL-Maghawry Nour EL-Dein

For: The Degree of M.Sc. (Agric. Sci. "Soils").

This Thesis has been Approved by:

Prof.Dr. Mohamed A. Mostafa, M. A. Mostafa

Prof. of Soil Science, Fac. of Agric., Ain Shams Univ.

Prof.Dr. Omar A.Gobran, Cassel 9

Prof. of Soil Science, Fac. of Agric., Menousiya Univ.

Prof. of Soil Science, Fac. of Agric., Menoufiya Univ.

Prof.Dr. Mohamed Abo El-Fadl, M. Abo El Fall...

Prof. of Soil Science, Fac. of Agric., Menoufiya Univ.

(Committee in Charge)

/ /1996 Shibin ElKom:

ACKNOWLEDGEMENT

The author whishes to express her profound gratitude and sincere appreciation to Prof. Dr. Refaat A.Khalil, Prof. of Soil Chemistry, Faculty of Agriculture, Menoufiya University, Prof. Dr. Mohamed Abo El-Fadl, Prof. of Soil Chemistry, Prof. of the same Depar. and Dr. Badr Y.El- Koumey Associate Prof. of the same Depar. for suggesting the problem, supervision, guidance, sincere help and constructive criticism throughout the course of study.

Deep thanks and appreciation are extended to Dr. Mohamed Goma, Senior Researcher, Soil and Water Research Institute, Director, Project Administration Executive Authority for Land improvement Projects (EALIP). Ministry of Agriculture and Land Reclamation for sincere help during this work.

Also, my appreciation is extended to staff members of the Soil Science Department, Faculty of Agriculture, Menoufiya University for supporting the facilities and cooperation.

CONTENTS

	Page
CREDIT SHEET	i
APPROVAL SHEET	ii
ACKNOWLEDGEMENTS	iii
1. INTRODUCTION	1
2. REVIEW OF LITERATURE	3
2.1. Soil Organic Matter	4
2.2.Humification	6
2.2.1. Factors Affecting the Rate of Humus Formation	6.
2.2.2. Effect of Soil Properties on Humus Formation	8
2.3 Extraction of Humic Substances	9
2.3.1. Fractionation and Purification of Humic Acid	11
2.4. Ratio Between Humic and Fulvic Acid in Humus Extract	13
2.5. Elementary Composition of Humic Acids 2.6. Total Acidity and Functional Groups of Humic Acids	
2.7. Spectroscopic Characteristics of Humic .Substances	20
2.7.1. Optical Properties of The Humic Acids	20
2.7.2. Infrared Absorption of Humic Acids	23
2.8. The Effect of Humic Substances on Plant Growth	
and Uptake of Some Nutrients	26
2.9.Effect of Trace -Elements on Plant Growth	33
3. MATERIALS and METHODS	35
2.1 Coil Correlate	36

3.2.Organic Residues	36
3.3. Incorporation of Plant Residues with Soil	36
3.4.Extraction and Fractionation of Humic Substances	38
3.4.1. Purification of Humic Acid	39 39
3.5.1. Humic Acid Carbon Content	40
3.5.2. Fulvic Acid Carbon Content	41
3.6. Elementary Composition of Humic Acids	41
3.7.Chemical Composition of Humic Substances	4 l
3.8. Spectrophotometry	41
3.8.1. Optical Density	41
3.9. Total acidity and functional groups of humic acids	42
3,9.1.Total Acidity	42
3 .9.2. Functional Groups	43
3.9.2.1. Carboxyl Groups	43
3.9.2. 2.Total Hydroxyl Groups	44
3.9.2.3. Phenolic Hydroxyl Groups	44
3.9.3.2. Alcoholic Hydroxyl Groups	44
3.10. Greenhouse	44
RESULTS and DISCUSSION	46
4.1. Humic Substances	47
4.1.1. Group Composition of Humic Substances	47
4.1.2. Changes in Macro - and Micronutrients in Extracted HumicSubstances During Decomposition Period	52

4.1.2.1. Carbon, Ntrogen Changes and CIN Ratio	52
4.1.2.2. Phosphorus and Potassium Changes	57
4.1.2.3. Manganese, Zincand Copper Changes	59
4.1.3. Optical Density of Humic Substances During	
Decomposition Period	60
4.2. Humic Acid	63
4.2.1. The Elementary Composition	.63
4.2.2. Chemical Characteristic of functional Groups of Humic	
Acids for Decompositio Period (120 days)	.67
4.2.2.1. Total Acidity	.67
4.2.2.2. COOH, Total -OH and Phenolic - OH Groups	69
4.2.3. Infrared Spectroscopy of Humic Acids	71
4.3. The Interaction Effect Between Different Concentrations of	
Humic Acid and Either Zn or Mn on the Growth and	
Uptake of Some Nutrents by Mmize Grown in Sandy and	
Alluvial Soils	75
5. SUMMARY and CONCLUSIONS	83
6. REFERENCES	88
7. ARABIC SUMMARY	.114

.

.

.

•

CHAPTER 1

 \overline{X}

※

※

※

※

※

※

※

※

※

<br/

 $\mathbb{Z}_{\mathbb{Z}}$

米器

XXX ZXX

X

ZZ

※認然認米認然認然

NA SIGNATURE OF THE PROPERTY O

米器

米器



THOOTHODUCTION

1. INTRODUCTION

Organic matter plays an important role in improving the physical, chemical and biological properties of soils. It substantially contributes to the fertility of soil by providing plant nutrients from its decomposition, by increasing cation - exchange capacity and water holding capacity.

Organic matter play a key role in the behavior of micronutrients in soils. Both soluble and insoluble complexes are formed substantial evidence (e. g., defined as biochemical compounds and humus substances) which play a prominent role in the dissolution of micronutrients and their transport to plant roots.

The present work was designed to study the effect of decomposition of different organic residues i.e., Sugarcane refuse, Water Hyacinth and Banana leaves, in sandy and alluvial soils on: a) The characterization of humic substances and humic acid extracted from different soils, and b) The effect of interaction between different concentrations of purified humic acid extracted from the used soils after decomposition of different organic materials and 10 ppm of Zn and / or Mn on some nutrints uptake by corn plant growing in alluvial and sandy soils.