



Fayoum University
Faculty of Science
Botany Department

Phytoremediation Potentiality of Some Weeds

On Contaminated Soils in Fayoum Province

By

Manar Ahamed Megahid Ibrahim

FAYOUM UNIVERSITY

2022



Fayoum University
Faculty of Science
Botany Department

**Phytoremediation Potentiality of Some Weeds on
Contaminated Soils in Fayoum Province**

By

Manar Ahamed Megahid Ibrahim

A thesis submitted in partial fulfillment

Of

The requirements for the degree of

Master of Science

Botany

(Ecology)

Botany Department

Faculty of Science - Fayoum

FAYOUM UNIVERSITY



2022

**Phytoremediation Potentiality of Some Weeds on Contaminated
Soils in Fayoum Province**
Fayoum University
Faculty of Science
Botany Department

By

Manar Ahamed Megahid Ibrahim

B.Sc. in Botany & Chemistry 2014

Faculty of Science

Fayoum University

Supervision Committee:

1- Ass.Prof.Dr. Nabil Abo El Kasem Abo Hamed (Deceased)

Assistant Professor, Botany Department, Faculty of Science, Fayoum University.

2- Ass.Prof.Dr. Reda Mohamed Taha

Assistant Professor, Botany department, Faculty of Science, Fayoum University.

Signature:

3- Prof. Dr. Abdel Nasser Amin Ahmed

Professor of Soil Science, Soils and Water Department, Faculty of Agriculture,
Fayoum University.

Signature:

4- Dr. Mai Sayed Fouad

Lecturer of Plant Ecology, Botany Department, Faculty of Science, Fayoum University.

Signature:

Approval Sheet

**Phytoremediation potentiality of some weeds on contaminated soils in
Fayoum Province**

By

Manar Ahamed Megahid Ibrahim

(B.Sc. in Botany & Chemistry 2014)

Faculty of Science

Fayoum University

This Thesis for M.Sc. degree in Botany

(Ecology)

has been approved by:

Supervision Committee:

1.Prof.Dr. Ana Cristina Horta Corvo Dias Pego

Geography and Territorial Planning – Economic Geography - Universidade Nova de Lisboa - UNL Lisbon - Portoughal.

2.Prof.Dr. kamal Mohamed omar zayed

Professor of plant Ecology, Botany Department, faculty of science,cairo university.

3. Report between:

Ass.Prof.Dr.Redah Mohamed taha

Assistant professor of plant Microbiology, Botany Department, faculty of science, Fayoum university.

Prof.Dr. Abdel Nasser Amin Ahmed

Professor of Soil Science, Soils and Water Department, Faculty of Agriculture, Fayoum University.

C.V.

Personal Introduction:

Name: Manar ahmed megahid ibrahaim

E-mail: mam41@fayoum.edu.eg

Address: Fayoum city

Nationality: Egyptian

Religion: Muslim

Job: demonstrator, Faculty of Science, Fayoum University, Egypt

Languages:

Arabic: Fluent

English: Fluent

Education and qualification:

B. Sc. From Faculty of Science, Fayoum University

(2014) (Excellent)

Field of research:

Plant Ecology

ABSTRACT

Fayoum depression is a green natural oasis located in the Western Desert on the west southern part of Cairo Governorate . The amaranth is widely distributed and has abundant varieties in Fayoum depression its rapid growth and large biomass can be served as candidate for cadmium and nickel hyperaccumulators for phytoremediation.

Presently the environment is heavily polluted by various toxic metals, which creates danger for all living beings. Heavy metals are toxic above certain threshold levels.

Pollution of plants by heavy metals is a critical health issue because metals can be transmitted to animals and humans. Heavy metal exposure induces an oxidative stress in plant, resulting in cellular damage and altered cellular ionic homeostasis. We also present bioremediation and phytoremediation methods to remove metals.

Phytoremediation is an emerging technology which is quite a novel technique of cleaning polluted sites through the use of plants.

Phytoremediation methods are comparatively cheap and ecologically advantageous, compared to conventional and physicochemical methods like precipitation, evaporation and chemical reduction it is an effective, economical and biocompatible method for remediation of contaminated soils. .

Amaranthus spp, an invasive weed seen on road sides and bare land belonging to the family *Amaranthaceae*, from surveying of growth sites of Amaranth plant in Fayoum Districts was selected for the present study.

An experiment was conducted and consisted of a range-finding test and definitive test for various concentrations of heavy metals Ni and Cd. Plants were grown in soil treated with different concentration of metals depending upon the threshold level. levels of control cadmium concentration (0, 2.5,5,10,20,40,80, 100 and 200 mg/kg) and levels of control Nickel concentration (0,60,80,160,320 and 400 mg/kg) Accumulation of Ni and Cd was high in the roots followed by shoots parts. The "translocation factor" (TF) and the "bioconcentration factor" (BCF) for element and metals within the studied species was calculated.

The effects of heavy metals on plants resulted in growth inhibition, structure damage, a decline of physiological and biochemical activities, as well as of the function of plants Heavy metal accumulation in soils is of concern in agricultural production due to the adverse effects on food safety, marketability and crop growth due to phytotoxicity, and environmental health of soil organisms. The influence of these heavy metals on plants and their metabolic activities caused by the geological and biological redistribution of heavy metals through pollution of the air, water and soil were briefly discussed.

Keywords: hyperaccumulators , phytoremediation , heavy metals , pot experiment .