

CONTENTS

1. INTRODUCTION	1
2. REVIEW OF LITERATURE	3
2.1. Heavy metals in soil and water.	3
2.1.1. Heavy metals in soils.	6
2.1.1.1. Total and available nickel (Ni).	7
2.1.1.2. Total and available cobalt (Co):	10
2.1.1.3. Total and available cadmium (Cd):	12
2.1.2. Heavy metals in water.	16
2.1.2.1. Heavy metals in fresh water.	17
2.1.2.2. Heavy metals in wastewaters.	19
2.2. Remediation of contaminated soils and wastewater:	23
2.2.1. Remediation of soils:	23
2.2.2. Remediation of water :	26
Mechanism of removal heavy metals:	29
 3. MATERIALS AND METHODS	30
3.1. Materials:	30
3.2. The experimental work:	30
3.2.1. The incubation experiments:	30
3.2.2. The water remediation experiment:	36
3.2.3. Chemical analysis:	36
 4- RESULTS AND DISCUSSIONS	38
4.1. Effect of the different applied amendments on	38
EDTA-extractable metal ions and their sorption	38
parameters	38
4.1.1. Poultry manure:-	48
4.1.2. Compost:-	58
4.1. 3. Bentonite:-	69
4.1.4. Rock phosphate:	80
4.1.5. Calcium carbonate:-	80

4.2. Effect of treating El-Gabal El-Asfar and El-Saff wastewater with different algae species on their residual contents, removed amounts and removal percentage of Cd, Co and Ni:	91
4.2.1. Cadmium:	91
4.2.2. Cobalt:	98
4.2.3. Nickel:	104
5-SUMMARY AND CONCLUSIONS	112
6-REFERENCES	117
ARABIC SUMMARY	*