

**BIOREMEDIATION OF AGRICULTURE WASTEWATER
USING SOME PLANT GROWTH PROMOTING
RHIZOBACTERIA AND ITS REUSE FOR
IRRIGATION OF SOME CROPS**

By

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B.Sc. Agric. Sc. (Agric. Biotechnology), Ain Shams University, 2011

**A Thesis Submitted in Partial Fulfillment
Of**

The Requirements for the Degree of

**MASTER OF SCIENCE
in**

**Agricultural Sciences
(Agricultural Microbiology)**

**Department of Agricultural Microbiology
Faculty of Agricultural
Ain Shams University**

2018

Approval Sheet

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ABSTRACT

Marwa Ibrahim Kahlil: Bioremediation of Agriculture Wastewater Using Some Plant Growth Promoting Rhizobacteria and Its Reuse for Irrigation of Some Crops. Unpublished M.Sc. Thesis, Department of Agric. Microbiology. Faculty of Agriculture, Ain shams University, 2017.

This investigation was conducted on agricultural drainage wastewater from El Mohete drain (Marioteya Canal) west of Cairo, the samples were collected from different places and different depth levels in (Summer and Winter seasons). The wastewater contaminated with pathogenic microorganisms, the excess of fertilizers (inorganic and organic), heavy metals, and the residuals of pesticides. By using some Plant Growth Promoting Rhizobacteria (PGPR) to remediate the wastewater as biological bioremediation. Chemical remediation was used as nitrification inhibitor to stop transformation of ammonia to nitrate. This work was conducted to study the ability of PGPR strains e.g. *Bacillus megaterium*, *Bacillus subtilis*, *Bacillus circulans*, *Paenibacillus polymyxa*, *Pseudomonas fluorescens*, *Serratia marcescens* and *Azotobacter* sp. *Azotobacter chroococcum* Azo.5, Azo.9 and Azo.23 to treat the drainage water for irrigate the *Mentha viridis* cv. and *Gladiolus grandiflorus* cv. plant. Two pot experiments were conducted in greenhouse. The treatments were applied as follows; Natural water, treated water and drainage water to irrigate the plant. Use the PGPR as inoculants and thiourea as nitrification inhibitor, Heavy metal treated was (Copper, Cobalt, Zinc, Cadmium and Mercury) showed the removal of heavy metals by PGPR from drainage water. The characterizations of PGPRs as shown in the obtained results are they could enhance plant

growth by using their own metabolism (solubilizing phosphate, producing hormones or fixing nitrogen) as well as correlation of them with the potent effects on the growth of plants in unfavorable conditions in order to improve the efficiency of phytoremediation of contaminated soils. The removal of heavy metals and the elimination of pesticides residues were markedly noticed in this investigation. Results also confirmed the ability of PGPRs in suppressing the effect of pathogenic bacteria like *Salmonella* sp. and *E.coli*. These abilities are of great importance in terms of plant and soil health. Consequently, the role of PGPRs bacteria associated with plant rhizosphere in remediation of water and soil contaminations due to its biochemical activity and thus, stimulate plant growth is a great important subject in phytoremediation process nowadays.

Key words: Phytoremediation, Bioremediations, Heavy metals, Pathogenic bacteria, PGPRs, *Mentha viridis* cv, *Gladiolas grandiflorus* cv.

ACKNOWLEDGMENT

Praise and thanks be to **Allah**, the most graceful, the most merciful for assisting and directing me to the right way.

Great thanks are to **Dr. Wedad El-Tohamy El-Sayed Eweda**, Professor Emeritus of Agric. Microbiology, Department of Agric. Microbiology, Faculty of Agric. Ain Shams University, for her kind supervision, moral and faithful attitude from the beginning to the end of this thesis work and supporting me during these past four years, constructive criticism of the manuscript, close guidance and keen interest. (Principal Supervisor). The successful accomplishment of this research work would not have been possible without the generosity and encouragement of my great supervisor Prof. Dr. Wedad, who gave me a great deal of her time, experience and un-limited support. My special thanks go to her for the unique guidance and suggestions throughout the entire work and especially for her confidence on me; thank you I learned from your insight a lot.

I am deeply grateful to **Dr. Mohamed Nabil Omar**, Professor of applied Microbiology, Microbiology Department, Soil, Water and Environment Research Institute, Agriculture Research Center, Giza, Egypt, for his remarkable influence, kind continuous cooperation and energetic leadership of our research team in the Institute. His expert supervision added much to my Knowledge.

I would like express my sincere appreciation to **Dr. MONA M. ORABI**, Professor Department of Agricultural Microbiology, Department of Agricultural Microbiology, Faculty of Agriculture, Ain Shams University, for her invaluable advices, helpful suggestions, critical discusses, precious assistance and helpful comments on the manuscript.

I would like to express my sincere thanks and deep gratitude to **Dr. Osama Nagde Massod**, Professor of applied Microbiology, Microbiology Department, Soil, Water and Environment Research Institute, Agriculture Research Center, Giza, Egypt, for his

I would also like to acknowledge **Dr. Nashwa Fetian** Professor of applied Microbiology, Microbiology Department, Soil, Water and Environment Research Institute, Agriculture Research Center, Giza, Egypt, for helping me without prior knowledge to the most important point in my work and free of charge, so I am really thank you a lot.

My heart full thanks and sincere appreciation to my family for their helpful support. Precious understanding, patience, encouragement all over my live.

CONTENTS

	Page
LIST OF TABLES	v
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS	xiii
1. INTRODUCTION.....	1
2. REVIEW OF LITERATURE.....	5
2.1. Water pollution.....	5
2.2. Agricultural wastewater (drainage).....	6
2.3. Physical characteristics of waste water.....	7
2.4. The pollutants in agricultural wastewater are	8
2.4.1. Organic pollutants	8
2.4.1.1. Pesticides	9
2.4.1.2. Microbial pollutants	9
2.4.2. Inorganic pollutants	10
2.4.2.1. Nitrogen content	10
2.4.2.2. Chloride	10
2.4.2.3. Phosphorus	11
2.4.2.4. Sulphate	11
2.4.2.5. Heavy metals	11
2.4.2.5.1. Harmful effect of some heavy metals ions	12
2.5. The application processes to removing of pollutants in agricultural wastewater	13
2.5.1. Preliminary treatment	13
2.5.2. Primary treatment	14
2.5.3. Secondary treatment	14
2.5.3.1. Physical	15
2.5.3.2. Chemical	15
2.5.3.3. Biological	15

2.6. Plant growth-promoting rhizobacteria (PGPR)	19
2.6.1. Plant growth promoting substances	21
2.7. Mechanisms of PGPR for removal pollution	23
2.7.1. Role of PGPR in degrading pesticides	23
2.7.2. Role of PGPR in removing heavy metals	24
2.7.3. Role of PGPR in inhibition pathogen microorganisms	25
2.8. The harmful effects of some pathogenic bacteria on human health and environmental	25
2.9. Role of PGPR inoculation on plant growth, physiological responses and yield	29
2.9.1. Induction of systemic resistance (ISR)	29
3. MATERIALS AND METHODS	32
3.1. Materials	32
3.1.1. Agricultural wastewater collection	32
3.1.2. Study area	33
3.1.3. Bacterial used	34
3.1.4. Media and solutions used.....	36
3.1.4.1. Media used for microbiological determination.....	36
3.1.5. Plant material used	40
3.1.6. Soils used	40
3.1.7. Fertilization used	41
3.1.8. Nitrification inhibitor used.....	42
3.2. Methods	42
3.2.1. Preparation standard inoculums	43
3.2.2. The optical density of growth microorganisms using in bioremediation of heavy metals and pesticides	43
3.2.3. The specific growth rate (μ) (h^{-1}) and doubling time (t_d) (h)..	43
3.3. Agricultural wastewater analysis	44
3.3.1. Physical analysis	44
3.3.1.1. Temperature	44

3.3.1.2. The hydrogen ion concentration (PH)	44
3.3.1.3. Electric conductivity (EC)	44
3.3.1.4. Total Solids (TS)	44
3.3.1.5. Total Suspended Solids (TSS)	45
3.3.2. Chemical analysis	45
3.3.2.1. Chemical Oxygen Demand (COD)	45
3.3.2.2. Biochemical Oxygen Demand (BOD)	46
3.3.2.3. Total phosphorus	46
3.3.2.4. Total nitrogen	46
3.3.2.5. Total potassium	46
3.3.2.6. Heavy metals analysis	47
3.3.2.7. Determination of the pesticide residues	47
3.3.2.8. Determination of NH_4^+ , NO_2^- and NO_3^- —N in wastewater samples homogenized sample were determined using calorimetric methods	47
3.3.2.8.1. Ammoninacel nitrogen (NH_4^+ —N) determination	47
3.3.2.8.2. Determination of NO_2^- —N	48
3.3.2.8.3. Determination of NO_3^- —N	48
3.3.2.9. Microbiological examinations	49
3.3.2.9.1. Total coliform	49
3.3.2.9.2. Fecal coliform	49
3.3.2.9.3. Salmonella and Shigella (SS)	49
3.4. Antagonistic action of the used strains against pathogenic microbial pollutants	49
3.5. Heavy metals biosorption by the PGPRs	50
3.6. Pot experiment	51
3.6.1. Irrigation	53
3.6.2. First experiment: Data recorded on <i>Gladiolas grandiflorus</i> cv.	53
3.6.2.1. Vegetative growth parameters	53

3.6.2.2. Flowering parameters	53
3.6.2.3. Corms and cormlets productivity	53
3.6.2.4. Chemical constituents	54
3.6.3. Second experiment: Data recorded on <i>Mentha viridis</i> cv...	54
3.6.3.1. Plant morphology	54
3.6.3.2. Plant parameters	54
3.6.3.2.3. Root growth parameters	54
3.6.3.2.4. Chemical constituents	54
3.6.3.2.5. Analysis of volatile oil	55
3.6.4. Chemical analysis	55
3.6.4.1. Leaf pigments (chlorophylls a& b, and carotenoids) ...	55
3.6.4.2. Determination of macro elements (N, P and K)	56
3.6.4.2.1. Determination of nitrogen (N)	56
3.6.4.2.2. Determination of phosphorus (P)	56
3.6.4.2.3. Determination of potassium (K)	57
3.6.4.2.3. Determination of carbohydrates	57
3.6.5. Enzymatic activities assay	57
3.6.5.1. Dehydrogenase activity in the used soil	57
3.6.6. Statistical analysis of data	57
3.6.7. Molecular analysis	57
3.6.7.1. DNA extraction	57
3.6.7.2. PCR for 16s rRNA gene sequence of the isolates	58
3.6.7.3. PCR electrophoresis	59
3.6.7.4. Sequencing of the cDNA fragments	60
3.6.7.5. Identification of the cDNA fragments and protein product(s) homologous to the cDNA using the NCBI database	61
4. RESULTS AND DISCUSSION	62
4.1. Sample analysis	62
4.1.1. Physical analysis	62

4.1.2. Chemical analysis	68
4.1.3. Microbiological analysis	73
4.2. Application some processes to removing of pollutants in agricultural waste water in vitro	78
4.2.1. Chemical treatments using thiourea as nitrification inhibitor	78
4.2.2. Biological Treatment	79
4.2.2.1. Treatments of some PGPRs to adsorption heavy metals in agricultural waste water	81
4.2.2.2. Treatments of some PGPRs to degrading pesticides found in agricultural waste water	81
4.2.2.3. Bioremediation of some pathogenic bacteria from wastewater using PGPRs in vitro	85
4.2.2.3.1. Antagonistic between PGPRs and pathogenic bacteria..	85
4.3. Bioremediation of homogenized drainage water using physical, chemical and biological treatments before application in pot experiments.....	100
4.3.1. Aeration	100
4.3.2. Physical and chemical analysis of different treatments on homogenized agricultural wastewater	100
4.3.3. Microbiological analysis	104
4.4. Soils used in pot experiments	108
4.5. Pot experiments	108
4.5.1. Effect of irrigation with treated of agricultural drainage water on the growth, flowering, corm production and chemical composition of <i>Gladiolus grandiflorus</i> cv. plants	109
4.5.1.1. Plant growth parameters.....	109
4.5.1.2. Chemical analysis	113
4.5.1.2.1. Chlorophyll a, b and carotenoids	113
4.5.1.2.2. Determination of nitrogen, phosphors and potassium (N, P and K) in plant	114
4.5.1.2.3. Determination of ammonia, nitrite and nitrate	120

4.5.1.3. Count of microorganisms in soil after irrigation with treated water...	120
4.5.1.4. Determination of enzyme activity	126
4.5.2. Effect of various treatment of agricultural waste water on the vegetative growth, yield, volatile oil productivity and its components and chemical analysis of spearmint (<i>Mentha viridis</i> cv.)	128
4.5.2.1. Morphological parameters	128
4.5.2.2. Chemical composition	130
4.5.2.2.1. Chlorophyll a, b and carotenoids	130
4.5.2.2.2. Determination nitrogen, phosphors and potassium (N, P and K) in plant.....	135
4.5.2.2.3. Determination of ammonia, nitrite and nitrate	135
4.5.2.3. Count of microorganisms in soil after irrigation with treated water	140
4.5.2.4. Determination of enzyme activity	140
4.5.2.5. Effect of various treatments on volatile oil productivity of spearmint (<i>Mentha viridis</i> cv.)	144
4.5.2.5.1. Volatile oil accumulation	145
4.5.2.5.2. Chemical composition of <i>Mentha viridis</i> oil	146
5. Human pathogenic bacterial strains Identification	155
5.1. PCR for 16S gene	155
5.2. Sequencing of selected DD cDNA fragments	156
6. SUMMERYAND CONCLUSION	161
7. REFERENCES	172
ARABIC SUMMARY	200

LIST OF TABLES

Table No.		Page
1	Locations of samples used in this study.....	32
2	Assessment of some metabolic activities of the selected strains.....	34
3	Physico-chemical analysis of the used soil in pot experiments.....	41
4	The treatments of both experiments were arranged as follow.....	52
5	PH of the obtained samples during winter and summer session.....	62
6	(The salinity EC dSm ⁻¹) of the obtained samples during winter and summer session.....	63
7	Determination of Total Solids (TS mg/L) and Total Suspended Solids (TSS mg/L) in wastewater samples collected from different sites along El Mohete drain during summer and winter season.	66
8	Determination of Chemical Oxygen Demand (COD mg/L) and Biochemical Oxygen Demand (BOD mg/L) in wastewater samples collected from different sites along El-Mohete drain during summer and winter season.....	67
9	The Seasonal variation of Nitrogen sources (NH ₄ , NO ₂ , NO ₃) ppm in wastewater samples during winter and summer season.....	69
10	Concentration of heavy metals in wastewater samples collected from different sites along El Mohete drain....	71
11	Concentration of pesticide residues µg/L in wastewater samples collected from different sites along El-Mohete drain.	74
12	The total and pathogenic bacterial counts (CFU/ml) in winter and summer season.....	76
13	Chemical treatments using thiourea as nitrification inhibitor.....	78

14	Continued chemical treatments using thiourea as nitrification inhibitor.....	78
15	The growth of some PGPRs and pathogenic bacteria in nutrient broth during 48 h at 30°C.....	79
16	The growth of PGPRs in drainage water incubated for 48 h at 30°C.....	80
17	Heavy metals (µg/L) concentration in *Homogenized sample of agricultural wastewater using growing PGPR after incubation for 48 hr at 30 ° C.....	83
18	Pesticide residues in homogenized agricultural wastewater sample using growing PGPR incubated for 48 hr at 30° C.....	84
19	Antagonistic action between single strain of PGPRs and pathogenic bacteria (<i>E.coli</i> and <i>Salmonella</i> sp) incubated for 48h at 30°C.....	86
20	Antagonistic action between dual strains of PGPRs and pathogenic bacteria (<i>E.coli</i> and <i>Salmonella</i>) incubated for 48h at 30°C.....	88
21	The antagonistic action between three mix strains PGPR and some pathogenic bacteria.....	92
22	The antagonistic action between four mix strains PGPR and some pathogenic bacteria.....	94
23	The antagonistic action between five mix strains PGPR and some pathogenic bacteria.....	96
24	The antagonistic action between six mix strains PGPR and some pathogenic bacteria.....	97
25	The antagonistic action between seven mix strains PGPR and some pathogenic bacteria.....	98
26	Chemical analysis (ppm) of Homogenized agricultural wastewater.....	101
27	Determination of physical and chemical analyses in drainage water used in plant irrigation after addition of different treatments for 48 h.....	102