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

By

MARWA IBRAHIM KAHLIL HASSAN

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

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This thesis for M.Sc. degree has been approved by:

Dr. Fatma Ibrahim El-Zamik …….
Prof. Emeritus of Agricultural Microbiology, Faculty of Agricultural, Zagazig University.

Dr. El-Shahat Mohamed Ramadan …….
Prof. Emeritus of Agricultural Microbiology, Faculty of Agriculture, Ain Shams University.

Dr. Mona Mansour Oraby …….
Prof. of Agricultural Microbiology, Faculty of Agriculture, Ain Shams University.

Dr. Wedad EL-Tohamey EL-Said Eweda …….
Prof. Emeritus of Agricultural Microbiology, Faculty of Agriculture, Ain Shams University.

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Under the supervision of:

Dr. Wedad EL-Tohamey EL-Said Eweda

Prof. Emeritus of Agricultural Microbiology, Department of Agricultural Microbiology, Faculty of Agriculture, Ain Shams University (Principal Supervisor).

Dr. Mona Mansour Oraby

Prof. of Agricultural Microbiology, Department of Agricultural Microbiology, Faculty of Agriculture, Ain Shams University.

Dr. Mohamed Nabil Omar

Head Research of Agricultural Microbiology Emeritus, Soils, Water and Environment Res. Inst., (SWERI) ARC.

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 Unpublished M.Sc.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 stopped 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 (solublizing phosphate, producing hormones or fixing nitrogen) as well as correlation of them with the potenit of effects on the growth of plants in unfavorable conditions in order to improve the efficiency of phytoremdiation of contarinated 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.

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