REMOVAL OF NUTRIENTS FROM SEWAGE USING SOME AGRICULTURAL WASTES

BY

MOHAMMAD FAHED DARWISH

B.Sc. in Physical and Chemical Science, 2003

Teshreen University

A Thesis submitted in partial fulfillment of the Requirements for the Master Degree In Environmental Science

Department of Environmental Basic Science

Institute of Environmental Studied and Research

Ain Shams University

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APPROVAL SHEET

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This Thesis Towards a Master Degree in Environmental Science Has Been Approved By:

Prof. Dr. Mohamed El Badry Shaban .....
Professor of Organic Chemistry, Faculty of Science, Ain Shams University, Cairo, EGYPT

Prof. Dr. Mohamed Saeed El khouly .....
Professor of Sanitary Engineering, Faculty of Engineering, Ain Shams University, Cairo, EGYPT

Prof. Dr. Ahmed Ismail Hashem .....
Professor of Organic Chemistry, Faculty of Science, Ain Shams University, Cairo, EGYPT

Prof. Dr. Mohamed El Hosseiny El Nadi .....
Professor of Sanitary Engineering, Faculty of Engineering, Ain Shams University, Cairo, EGYPT

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Under the Supervision of:

Prof. Dr. Ahmed Ismail Hashem .....
Professor of Organic Chemistry, Faculty of Science, Ain Shams University, Cairo, EGYPT

Prof. Dr. Mohamed El Hosseiny El Nadi .....
Professor of Sanitary Engineering, Faculty of Engineering, Ain Shams University, Cairo, EGYPT

Prof. Dr. Mohamed Ahmed Khalifa El-Deek .....
Professor of Organic Chemistry, Faculty of Science, Ain Shams University, Cairo, EGYPT

DEDICATION

This work took a period from my life. I wish to dedicate it

To My Family, My Friends
&
My Country
Syria

STATEMENT

This dissertation is submitted to Ain Shams University, Institute of Environmental Studies and Researches, for the degree of M.Sc. in Environmental Science.

The work included in this thesis was carried out by the author in El-berka wastewater treatment plant nearby Cairo city, Egypt, Institute of Environmental Studies and Researches, Ain Shams University, from October 2007 to April 2009.

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Finally, Sincere thanks to the staff and personnel of National Research Center specially ***Dr. Hilmy Tawfik Elzanfaly,*** *Professor of microbiology, Unit of Water pollution, National Research Center, for their help in the microbiological analysis during this study.*

List of abbreviations

(BODS)	**Soluble biochemical oxygen demand.**
(BODT)	**Total biochemical oxygen demand.**
(CAS)	**Coarse almond shell.**
(CCW)	**Coarse cotton wood.**
(CODS)	**Soluble chemical oxygen demand.**
(CODT)	**Total chemical oxygen demand.**
(CSS)	**Coarse sunflower stalks.**
(DO)	**Dissolved oxygen.**
(DS)	**Dissolved solids.**
(EBPR)	**Enhanced biological phosphorus removal.**
(FAS)	**Fine almond shell.**
(FCW)	**Fine cotton wood.**
(FSS)	**Fine sunflower stalks.**
(MCW)	**Medium cotton wood.**
(MSS)	**Medium sunflower stalks.**
(N)	**Nitrogen.**
(P)	**Phosphorus.**
(PAOs)	**Phosphate accumulating organisms.**
(R2A)	**Low nutrient medium.**
(SS)	**Suspended solids.**
(TOC)	**Total organic carbon.**
(TS)	**Total solids.**
(TSS)	**Total suspended solids.**

ABSTRACT

Name: - ***MOHAMMAD FAHED DARWISH.***

Title : - "**Removal of nutrients from sewage using some agricultural wastes"**

Faculty : - **Institute of Environmental Studies and Researches, Ain Shams University.**

Speciality : - **Environmental Basic Science.**

Abstract :-

Using biomass wastes as media to remove wastewater contaminants is environmentally very important to reduce agricultural wastes accumulation and wastewater treatment. This study has been made to remove the nutrients from sewage using some agricultural wastes; cotton stalks wood, sunflower stalks and almond shells. All experimental studies were constructed in El-Berka wastewater treatment plant nearby Cairo city, Egypt.

The objective of this study is to investigate physiochemical and biological effects**.** In physiochemical effects, agricultural wastes were used as a media by dividing them into three forms (coarse, medium and fine). Parallel column scale experiments were carried out with depths of the media between (8, 12, and 20) cm at flow rate of wastewater into the media around (1L/h). The removal efficiency of the sewage parameters TSS, COD, BOD, N and P for each form were measured. In biological effects, microbiological activities determinations were done for agricultural wastes samples so the degree of biological effect in wastewater treatment can be determined.

The results obtained in this work showed that an increase in the media depth increased the nutrients removal efficiency Re%. Also, when the pieces of agricultural waste around (fine and medium) the nutrient removal efficiency Re% was found to be relatively close and greater than coarse form. Removal efficiencies for nitrogen compounds were more than 50 % and reach to 94% and for phosphoric compounds were 40% to 90%. By comparing between the three types almond shells are better in nutrients removal efficiency than sunflower stalks and cotton stalks wood. These results emphasize the environmentally effectiveness of using cotton stalks wood, sunflower stalks or almond shell as media for wastewater treatment.

KEYWORDS:

Wastewater Treatment, Agricultural Wastes, Nutrients Removal, Parallel Columns.

AIM OF WORK

The work presented in this thesis aim at:

1. Studying the possibility of using the agricultural wastes as treatment material to remove contaminates from the sewage.
2. investigating the efficiencies of treatment by:
    (i) Detection the best agricultural waste.
    (ii) Detection of the best physical form of the agricultural waste with respect to its removal efficiency.
3. Reducing the costs of sewage treatment.
4. Reducing the agricultural wastes which on burning by the farmers represent an environmental problem.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES