ENHANCEMENT OF MODIFIED SEPTIC TANK BY USING EFFECTIVE MICROORGANISMS

A Thesis
Submitted to the Faculty of Engineering
Ain Shams University for the Fulfillment
of the Requirement of M.Sc. Degree
In Civil Engineering

Prepared by

ENG. HEBA FATHI GOMAA MANSOUR

B.Sc. in Civil Engineering, June 2004
Faculty of Engineering – Ain Shams University

Supervisors

Prof. Dr. MOHAMED EL HOSSEINY EL NADI,
Professor of Sanitary & Environmental Engineering
Faculty of Engineering, Ain Shams University, Cairo, EGYPT

Dr. MOHAMED ALY FERGALA,
Assoc. professor of Sanitary & Environmental Engineering
Faculty of Engineering, Ain Shams University, Cairo, EGYPT

Dr. MOHAMED SOBHY ABDEL RAHMAN,
Assistant professor of Sanitary & Environmental Engineering
Faculty of Engineering, Ain Shams University, Cairo, EGYPT

2011

ENHANCEMENT OF MODIFIED SEPTIC TANK BY USING EFFECTIVE MICROORGANISMS

A Thesis For
The M.Sc. Degree in Civil Engineering
(SANITARY ENGINEERING)

by

ENG. HEBA FATHI GOMAA MANSOUR
B.Sc. in Civil Engineering, June 2004
Ain Shams University

THESIS APPROVAL

EXAMINERS COMMITTEE	SIGNATURE
Prof. Dr. Hamdy Ibrahim Aly Ahmed Professor of Sanitary & Environmental Engineering Faculty of Engineering, Ain Shams University	----------
Prof. Dr. Salah-Aldeen Mohamed Bayomy Professor of Sanitary & Environmental Engineering Faculty of Engineering, Zagazig University	----------
Prof. Dr. Mohamed El Hosseiny El Nadi Professor of Sanitary & Environmental Engineering Faculty of Engineering, Ain Shams University	----------

Date: - ---/--/2011

DEDICATION

I wish to dedicate this work to whom suffered to educate, prepare, build capacity and help myself to be as I am,

To
My Mother & My Father
&
My Brothers and Sisters

Also thanks

To My Husband

For his encouragement and support to complete this work.

Finally for **My Dear Son** to be proud me

STATEMENT

This dissertation is submitted to Ain Shams University, Faculty of Engineering for the degree of M.Sc. in Civil Engineering.

The work included in this thesis was carried out by the author in the department of Public Works, Faculty of Engineering, Ain Shams University, from September 2007 to July 2011.

No part of the thesis has been submitted for a degree or a qualification at any other University or Institution.

The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others

Date: - ---/-- /2011

Signature: - ----------

Name: - ***HEBA FATHI GOMAA MANSOUR***

ACKNOWLEDGMENT

The candidate is deeply grateful to **Prof. Dr. Mohamed EL Hosseiny EL Nadi**, *Professor of sanitary and Environmental Engineering, Faculty of Engineering, Ain Shams University, for help, encourage, co-operation sponsoring and patient advising during preparation of this work.*

Also, great thanks to **Dr. Mohamed Aly Fergala,** *Assoc. Professor of sanitary and Environmental Engineering, Ain Shams University, for her help, and co-operation during the preparation of the study.*

Also, great thanks to **Dr. Mohamed Sobhy Abdel Rahman,** *Assistant Professor of sanitary and Environmental Engineering, Ain Shams University, for her help, and co-operation during the preparation of the study.*

Special thanks to **Prof. Dr. Tarek I. Sabry,** *Assistant Professor of sanitary and Environmental Engineering, Ain Shams University, for his cooperation and assistance to obtain scientific sources, as well as the laboratory pilot.*

Also, very grateful to the staff and the laboratory personnel In El Berka waste water treatment plant, Cairo Governorate, *for their encouragement, help, and support during thesis preparation.*

There aren't words reflect the grateful towards **Prof. Dr. Ibrahim Fathy Shaker,** *and* **M.G. Belassy Shaker.**

ABSTRACT

NAME*: -* HEBA FATHI GOMAA MANSOUR

***Title*: - "ENHANCEMENT OF MODIFIED SEPTIC TANK BY USING EFFECTIVE MICROORGANISMS"**

Faculty : - Faculty of Engineering, Ain Shams University.
Specialty: - Civil Eng., Public Works, Sanitary Eng.

Abstract:-

The increase of waste water environmental problems in Egypt rural areas with the high cost of traditional treatment, led to try new low cost treatment techniques to get high efficiency and low cost. One of these techniques is the Upflow Septic tank/Baffled Reactor (USBR) that achieves removal efficiency from 80 to 85% for all parameters developed by a research team from Faculty of Engineering, Ain Shams University.

The study had used the effective microorganisms to improve the SBR removal efficiency. It was developed and tested at pilot scale for twenty-two months in El Berka sewage treatment plant where was studying the impact of adding EM by adding a different doses (0.5-4) g/l in order to determine the optimum dose which raise the efficiency.

The system has demonstrated satisfactory removal results even at high wastewater strength that when EM addition applied at second part of the unit, the overall removal ratios were 96%, 93.5% and 90.9% for $COD_{tot.}$, BOD_5 and T.S.S respectively.

The optimum mixing ratio (dose) of EM which gets the maximum removal efficiency was 3 g/l this dose enhanced the system stability under variable inlet load and accelerated the reaching to the steady state.

The study recommended that system is suitable to be applied for the small communities with small sewage flow and the private separate housings to get optimal benefits from this system.

SUPERVISORS
Prof. Dr. Mohamed EL Hosseiny EL Nadi,
Dr. Mohamed Aly Fergala,
Dr. Mohamed Sobhy Abdel Rahman,

TABLE OF CONTENTS

LIST OF FIGURES