بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / سامية زكى يوسف

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

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AIN SHAMS UNIVERSITY

FACULTY OF ENGINEERING

Public Works

Optimization of the Domestic Grey Water Treatment

A Thesis submitted in partial fulfillment of the requirements of the degree of
Master of Science in Civil Engineering
(Public Works)

by

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Bachelor of Science in Civil Engineering
(Public Works)
Faculty of Engineering, The British University in Egypt, 2019.

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Cairo - (2022)

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Date: 06 August 2022

DEDICATION

This thesis is dedicated to those who contributed to educating, raising and supporting me to be able to accomplish it in this form

TO MY PARENTS,

BROTHER & SISTER

Also, I wish to dedicate my thesis to my Professors

PROF. DR. TAREK ISMAIL SABRY

ASSOC. PROF. DR. HOSSAM MOUSTAFA

DR. MOHAMED HUSSEIN HEGAZY

For the encouragement and support to complete this work.

STATEMENT

This thesis is submitted as a partial fulfillment of Master of Science in Civil Engineering, Faculty of Engineering, Ain Shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or a qualification at any other scientific entity.

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Thesis Summary

The reuse of treated grey water is providing a good potential challenge as a secondary source of raw water. Many countries around the world are facing water sacristy and the treatment and reuse of the grey water collected from households reduces the dependency on natural diminishing water sources and also reduces the discharge of wastewater to sewers and treatment plants; as its treatment can be locally treated on-site.

In Egypt the gap between the available water supplies and the required demands is gradually increasing and it is, currently, estimated that the water demands are more than the available supplies. Wastewater used for domestic purposes represents (80-90) % of the total domestic supplies and if properly treated can be further utilized and reused and add up as a secondary water source. Many technologies are currently adopted for wastewater treatment and they are basically grouped under physical, biological or chemical treatment methods.

Experimental studies on three pilot treatment plants were conducted for a period of about five months. The experimental work was done in the sanitary engineering laboratories of the Faculty of Engineering, British University in Egypt. Grey water was collected from the University buildings and students hostels and the three treatment methods tested included; sand filtration, coagulation and activated sludge.

Results of the operation of the three pilot plants indicated that sand filtration at low flux rates gives treated grey water with acceptable effluent values. Both aluminium sulphate and ferric chloride gave good results at higher coagulant doses. The activated sludge process demonstrated excellent removal efficiencies at higher retention time. In general, the activated sludge process more efficient than the physio-chemical process followed by the physical process.

Key words:
Grey water, treatment systems, sand filtration, coagulation, activated sludge, total suspended solids, chemical oxygen demand.

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