IMPROVMENT OF DRAINS WATER QUALITY DOWNSTREAM DISPOSAL POINTS USING AGRICULTURAL WASTES

A Thesis
Submitted to the Faculty of Engineering
Ain Shams University for the Fulfillment
of the Requirement of Ph. Degree
in Civil Engineering

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Date:- ---/--/2015

DEDICATION

It took from me a portion of my life to finish this work, and I return the credit of finishing this work to God.
I wish to dedicate this work to who suffered to educate, prepare, build capacity and help myself to be as I am,

TO

MY MOTHER

AND

MY FATHER

AND I LIKE TO DEDICATE THE WORK TO MY LOVELY CHILDREN

BASEL & MOHAMED

STATEMENT

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

The work included in this thesis was carried out by the author in the department of Irrigation and Hydraulics, Faculty of Engineering, Ain Shams University, from October 2012 to May 2014.

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: - --- /-- /2015

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

Name: - ***MARWA ABDEL FATTAH ABD ALLA***

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ABSTRACT

NAME :- MARWA ABDEL FATTAH ABD ALLA

Title :- ***"IMPROVMENT OF DRAINS WATER QUALITY DOWNSTREAM DISPOSAL POINTS USING AGRICULTURAL WASTES"***

Faculty : Faculty of Engineering, Ain Shams University

Specialty : Civil Eng., Irrigation and Hydraulic Department

Summary :

This study aims to use agricultural wastes of ficus trees pruning, rice husk and Poinciana trees pruning as a biomedia to improve self purification process in polluted stream bodies. Also it aims to produce a mathematical model for this treatment take into consideration media self purification effect.

An experimental pilot channel was conducted for studying the effect of using biomedia with length equal to 25 and 50cm through the stream flow. A wastewater tank was used as a source of wastewater. Measurements of water samples were done for different parameters for three weeks.

Experimental measurements illustrate the removal ratio was higher by using 50cm ficus tree pruning more than using 25cm of the same media. It achieved 77% for COD and 76% for BOD and decreased the required length for self purification approximately by 154m for COD and 135m for BOD. The measurements also illustrate that using 50cm of rice husk achieved high removal ratio more than using 25cm of the same media. It achieved 60% for COD and 67% for BOD and decreased the required length for self purification by approximately 91m for COD and 90m for BOD. Poinciana trees pruning achieved higher removal efficiency for 50cm more than 25cm. it was 63% for COD and 65% for BOD and decrease the required length for self purification by 17m for COD and by 20m for BOD.

An imperical model equation was produced and verified then applying on results to calculate removal ratio and it had error percents between -8.76 % and + 9.23% for COD and – 8.02% and +9.93% for BOD.

Neural networks confirm the produced model equation for prediction of COD and BOD removal ratios when using this method in water stream bodies by error range between -1.44% & +2.00%.

Supervisors:

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Dr. Ghada Mahmoud Samy

Keywords

Water quality, self purification, agriculture waste, pollution control, streams.

ABBREVIATIONS

ANN	Artificial neural network
ASB	Aerated stabilization basin
BAF	Biological aerated filter
BOD	Biochemical oxygen demand
BOD_5	Biochemical oxygen demand at the fifth day of the experiment
COD	Chemical oxygen demand
DBAF	Dual biological aerated filter
DO	Dissolved oxygen
EB	Eucalyptus bark
FBR	Fluidized bed reactor
GAC	Granular activated carbon
MBR	Membrane biological reactor
MLP	Multilayer layer perceptron
MSE	Mean Square Error
PRH	Phosphate rice husk
PVC	Polyvinyl chloride
RBC	Rotating biological contactor
RBF	Radial basis function
S.P.	Self purification
SS	Suspended solids
SSFW	Subsurface flow wetland
TB	tubular
TDS	Total dissolved solids
TF/SC	Trickling filter / solids contact
TSS	Total suspended solids
UFBR	Up flow fixed bed reactor
VF	Vertical flow
VFW	Vertical flow wetland
VSS	Volatile suspended solids
XF	Cross flow

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