Monitoring and evaluation of some chemical parameters associated with changing the effluent rates on El-Rahawy drain and their impact on water quality of Rosetta branch

A thesis

Submitted by

Eman Al-Tohamy Abd Al-Satar Metawea

(B.Sc., Chemistry-Botany, Ain Shams University, 2002)

For the Partial Fulfillment

of Master Degree of Science
(Analytical Chemistry)

To

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رصد وتقييم بعض المعاملات الكيميائية المصاحبة لتغير معدلات الصرف على مصرف الرهاوى و تأثيرها على نوعية المياة بفرع رشيد

رسالة

مقدمة من

إيمان التهامى عبدالستار مطاوع

(بكالوريوس كيمياء–نبات, جامعة عين شمس,٢٠٠٢)

للحصول على

درجة الماجستير في العلوم

(كيمياء تحليلية)

إلى

قسم الكيمياء

كلية العلوم

جامعة القاهرة

٢٠٠٩

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ABSTRACT

Name: Eman Al-Tohamy Abd Al-Satar Metawea

Title of Thesis: Monitoring and evaluation of some chemical parameters associated with changing the effluent rates on El-Rahawy drain and their impact on water quality of Rosetta branch.

Degree: (M.Sc.) unpublished Master of Science Thesis, Faculty of Science-Cairo University, 2009.

The current investigation aims to study the drainage water characteristics of El-Rahawy drain and its effect on water quality of Rosetta branch with taking for consideration the seasonably mutation and the effluent rates of El-Rahawy drain on Rosetta branch. El-Rahawy drain lies at 30 Km to the North of Cairo at El-Kanater El-Khyria area, the drain receive domestic and agricultural wastes from Giza city and pure its effluents directly into the Nile water of Rosetta branch.

To achieve this work, surface water and bed sediment samples were collected from eight sampling locations along El-Rahawy, El Moheet drain and Rosetta branch during the period from June 2008 to May 2009. The physico-chemical and microbial analysis of collected water samples revealed that the drain as well as Rosetta branch downstream the drain suffering from chemical and bacteriological pollutions specially during the low flow condition (winter season) while Rosetta branch upstream El-Rahawy drain was within the permissible standard limits. Along El-Rahawy and El Moheet drain, there was a sharp increase in EC, NH_3, COD, BOD, TDS and great depletion in DO which was seriously deteriorating the area downstream the drain. While bacterial contamination was recorded in all studied water samples with varying levels of

pollution, being maximum at the middle of El-Rahawy drain, and the concentration of heavy metals in water samples was in the order of Fe> Mn > Zn> Cu> Pb> Cr> Ni> Co> Cd.

Analyses of digested bed sediment samples showed high concentrations of organic matter, carbonate and total heavy metals which ranged in the order of Fe> Mn> Zn> Cr> Cu> Co> Pb> Ni> Cd.

Keywords: physico-chemical, microbial, surface water, bed sediment, low flow condition, Rosetta branch and El-Rahawy drain.

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NOTE

Beside the work carried out in this thesis, the candidate had attended and successfully passed a final examination of M.Sc. courses (2007) in non organic chemistry covering the following topics:

1- Mechanism of inorganic reactions.	2- Advanced analytical chemistry.
3- Chelatimetry.	4- Statistical thermodynamics.
5- Quantum chemistry.	6- Molecular structure.
7- Solar energy.	8- X- rays thermal analysis.
9- Adsorption chemistry.	10 -Molten salts and Metallurgy.
11- Voltammetry.	12- Nuclear chemistry.
13- Group theory.	14- Electrochemistry.
15- Electro Kinetic phenomena.	16- Catalysis.
17- Advanced inorganic chemistry.	18- Physical polymer.
19-Statistical.	20- German language.

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E*man* ***A****l-Tohamy*

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LIST OF ABBREVIATIONS

ABBREVIATIONS	SIGNIFICANCES
APHA	American Public Health Association
ANOVA	Analysis of Variance
BCM	Billion Cubic Meters
BOD	Biological Oxygen Demand
CEQGs	Canadian Environmental Quality Guidelines
CFU	Colony Forming Unite
CON	Concentration of Organic Nitrogen
COD	Chemical Oxygen Demand
DIN	Dissolved inorganic nitrogen
DO	Dissolved oxygen
DP	Dissolved Phosphorus
DWAF	Department of Water Affairs and Foresty
EPA	Environmental Protection Agency
FC	Fecal coliform
FAO	Food and Agriculture Organization of the Unite Nations
ICP-OES	Inductively coupled plasma –Optical Emission Spectrometry
IC	Ion chromatography
MDL	Method detection limits
MDR	Microwave digestion rotor
M/D	Monovalent to Divalent
MPN	Most Probable Number
NWRC	National Water Research Center
NWRP	National Water Resources Plane
OM %	Organic matter percent
SJR	San Joaquin River
TC	Total coliform
TDS	Total dissolved solids
TKN	Total kjeldahl nitrogen
TS	Total solids
TWQR	Target Water Quality Range
WHO	World Health Organization
WWTP	Waste Water Treatment Plant
YRIZ	Yangtze River Intertidal zone

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