Biochemistry Department

Evaluation of some biochemical parameters of sheep in West Alexandria area

Thesis

Submitted for the degree of Master of Science as a partial fulfillment for requirements of M.Sc. Degree in Biochemistry

Submitted By

Manar Ali Sayed Hassan

(B.Sc. in Biochemistry, 2004)

Under the Supervision of

Prof. Dr. Ibrahim Hassan Borai

Professor of Biochemistry, biochemistry Department
Faculty of Science, Ain Shams University

Prof. Dr. Sayed M. M. Abd El Baky

Professor of Parasitology, Parasitology Unit
Animal Health department, , Desert research Center

Dr. Maha Moustafa Kamal

Assistant Professor of Biochemistry , Biochemistry Department
Faculty of Science, Ain Shams University

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Faculty of Science
Biochemistry Department

Approval sheet

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- **Prof. Dr. Ibrahem Hassan Borai** — Professor of Biochemistry, Faculty of Science, Ain Shams University.
- **Prof. Dr. Sayed M. M. Abd El Baky** — Professor of Parasitology, Animal health department, Desert Research Center.
- **Dr. Maha Moustafa Kamal** — Assistant Professor of Biochemistry , Faculty of Science, Ain Shams University.

Examiners Committee:

- **Prof. Dr. Yehia Shaker Mohamed Hamed Shaker** — Professor of Biochemistry, National Research Center.
- **Prof. Dr. Rauf Mohamed El-Allawy** — Professor of Biiochemistry, National Organization for Drug Control and Research (NODCAR).
- **Prof. Dr. Ibrahem Hassan Borai** — Professor of Biochemistry, Faculty of Science, Ain Shams University.
- **Prof. Dr. Sayed M. M. Abd El Baky.** — Professor of Parasitology, Animal health department, Desert Research Center.

Abstract

Drainage water provides an integral supplement to Egypt's water supply. As with many countries through the world that have turned to non-conventional sources in the face of freshwater scarcity, the reuse of drainage water is one of the main reasons why Egyptians can use a larger quantity of water than that which flows into the country, falls as rain, and is pumped from deep aquifers each year. The potential health risks and environmental impacts due to wastewater use for irrigation have been well documented. Although pesticides facilitate the anthropogenic land use, they usually cause danger to the biotic species and seriously damage the human living environment. Using natural clay minerals such as bentonite and zeolite for water and wastewater treatment are increasing due to their abundance, low price, and adsorption capabilities, as well as ion exchange that is highly capable of adsorbing all kinds of pollutants for some organic and inorganic compounds, including heavy metals in waters. The objective of this study is to Identify the side effects to which animals are exposed due to exposure to pollution from west Alexandria region through Evaluating the level of selected heavy metals in serum, milk and water samples and comparing the results to globally acceptable standards, Detecting the presence of pesticide residues in water and milk samples, Assessing the effect of the contaminated water on the liver, kidney and heart of sheep for possible prediction of effects on human and Investigate the remediating effect of bentonite . This study was conducted on 30 dry female sheep, age 2-3 years each weighing about 25-35 Kg, randomly divided into 3 groups 10 animals each according to the received water, the control group received fresh tap water , the 2nd group received water from the studied drain and the 3rd group received drain water plus 4 % bentonite . The study revealed that there were marked significant differences between the biochemical parameters of treatment animals when compared to control animals. There is no an elevated risk of E. coli contamination as illustrated by the low frequency of E. coli detected on the water samples. Also prolonged exposure to heavy metals from polluted water can develop serious health

problems as a result of excessive accumulation of these metals in the human body through dietary intakes.

Key words: *Drainage water, Heavy metals, Pesticide residues, Barki sheep and Bentonite.*

Dedication

I dedicate this work to whom my heart felt thanks; to my parents , my husband, my sons Mohamed and Ahmed for their patience and help , as well as my brothers and my sisters for all the support they lovely offered along the period of the study. and for the soul of my Godfather Abdel Fattah Rashed , may God bless his soul .

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Great appreciation is also extended to all the staff members of Animal Health Department , Desert Research Center .

Manar Ali

Acronyms and abbreviations

4-AP:	Amino-4-antipyrine
ADP:	Adenosine diphosphate
AgNO3:	Silver nitrate
AIUM :	Auroville Innovative Urban Management.
ALP:	Alkaline phosphatase
ALT:	Alanine aminotransferase
AMP:	Adenosine monophosphate
ANOVA:	Analysis of variance
ARLA:	acute ruminal lactic acidosis.
AST:	Aspartate aminotransferase
ATP:	Adenosine triphosphate
CBC:	Complete blood picture
CfU :	Colony forming unit .
CHD :	Coronary Heart Disease
CK-B:	Creatine-kinase B fraction
CK-M:	Creatine-kinase M fraction
CK-MB:	Creatine-kinase MB fraction
CO_3^{2-} :	Carbonate
CPK:	Creatine phosphokinase
DEA:	Diethanolamine
DRC:	Desert Research Center
dS/cm:	DeciSemens/centimeter

EC: Electric conductivity

EDTA: Ethylene diamine tetra acetic acid

EMB: Eosin methylene blue

EPA : Environmental Protection Agency.

G6P: Glucose-6-phosphate

G6PDH: Glucose-6-phosphate dehydrogenase

GOD: Glucose oxidase

H_2O_2 : Hydrogen peroxide

Hb : Hemoglobin

HCl : Hydrochloric acid

HCO3- : Bicarbonate

Hct : Hematocrit

HK: Hexokinase

HM : Heavy metals

HNO3: Nitric acid

HPLC: High pressure liquid chromatography

iCAP : Inductively Coupled Argon Plasma

IHD : Ischemic Heart Disease

IOM : Institute of Medicine ; Dietary Reference Intakes.

KCl : Potassium chloride

KCN: Potassium Cyanide

LBW : Low birth weight

LDH: Lactate dehydrogenase

MCH: Mean corpuscular haemoglobin

MCHC: Mean corpuscular haemoglobin count

MCV: Mean corpuscular volume

MDH: Malate dehydrogenase

MeqlL : Milligram equivalent per liter

MPN: The most probable number

MTF: Membrane filtration technique

NAC: N-acetyl-L-cysteine

NADH: Nicotinamide adenine dinucleotide

NADP: Adenine dinucleotide phosphate

NRC : National Research Council.

NRC : National Research Council.

OPP: Organophosphate Pesticide Poisoning

PCV: Packed cell volume

pH: Concentration of hydrogen ion

POD: Peroxidase

RBC: Erythrocyte count (red blood cells)

SAR: Sodium adsorption ratio

SO_4^{2+} : Sulphate

SOD : Super oxide dismutase

TDS: Total dissolved solids

TRBC: Total red blood cell count

US FDA US Food and Drug Administration

US.G.A.O : US. General Accounting Office

WHO : World Health Organization

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