بسم الله الرحمن الرحيم

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

ملاحظات: ....

STUDIES ON THE EFFECT OF CERTAI PHOTOSENSITIZERS ON BIOLOGICAL, BIOCHEMICAL AND HISTOLOGICAL PROPERTIES OF BULINUS TRUNCATUS SNAILS

Submitted By

Hebat-Allah Ahmed Saleh dokmak

B. Sc., Botany, Faculty of Science, Al-Azhar University (Girls Branch); (1996)
M.SC In Plant Physiology, Botany and Microbiology Department,
Faculty of Science, Al-Azhar University (Girls Branch); 2003

A Thesis Submitted in Partial Fulfillment

Of

The Requirement for the Doctor philosophy Degree

In

Environmental Sciences

Department of Environmental Basic Sciences

Faculty of Graduate Studies and Environmental Research

Ain Shams University

2022

APPROVAL SHEET

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This thesis was discussed and approved by:

The Committee

Signature

1-Prof. Dr. Mostafa M. Ramadan
Professor of Parasitology
Faculty of Education
Ain Shams University

2- Prof. Dr. Basma Mohamed Abou-Elnour
Professor of Parasitology
Faculty of Science – zoology Department
Al-Azhar University (Girls Branch)

3-Prof. Dr. Mohamed Abd El-Wahab. El-Emam
Professor of Medical Malacology
Environment Researches and Medical Malacology Department
Theodor Bilharz Research Institute

4-Prof. Dr. Magdy Tawfik Khalil
Professor of Aquatic Ecology,
Zoology Department,
Faculty of Science,
Ain Shams University

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1-Prof. Dr. Magdy Tawfik Khalil
Professor of Aquatic Ecology,
Zoology Department,
Faculty of Science,
Ain Shams University

2-Prof. Dr. Mohamed Aba El-Wahab. El-Emam
Professor of Medical Malacology
Environment Research and Medical Malacology Department
Theodor Bilharz Research Institute

3- Prof.Dr. Hanan Shhat Mossalem
Professor of Medical Malacology
Environmental Research and Medical Malacology Department
Theodor Bilharz Research Institute

4-Prof.Dr. Tarek AbdAllah El-Tayeb Ahmed
Professor of Photobiology
National Institute for Laser Enhanced Science
Cairo University

2022

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ABSTRACT

This study evaluates the photosensitization technique for controlling the snail intermediate hosts of schistosomiasis. So, carbamide perhydrate along with copper and magnesium chlorophyllin (Cu-chl and Mg-chl) were bioassayed against *Bulinus truncatus* snails; the intermediate host of *Schistosoma haematobium*. The results indicated that LC_{50} values of carbamide perhydrate, Cu-chl and Mg-chl were 91.73, 571.4 and 395.1 ppm, respectively. In addition, the sublethal concentrations of these agents induced significant deleterious changes in snails' fecundity and reproduction rate, sex hormones (progesterone, testosterone and 17-β estradiol), the activities of transaminases AST, ALT and alkaline phosphatase (AKP) enzymes, as well as the concentrations of total protein, albumin and globulin. Moreover, histopathological damages were observed in the tissues and cells of the digestive and hermaphrodite glands of treated snails. Also, these agents significantly reduced the infection of *B. truncatus* snails with *S. haematobium* miracidia and the production of cercariae from infected snails which have a negative reflection on the transmission of this parasite. Hence, these agents should be considered as a new technique for controlling this parasitic disease.

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ABBREVIATIONS

$\sum$(LxMx) : Summation of L_x and M_x

AKP : Alkaline phosphatase

Alt : Alanine aminotransferase

AST : Aspartate aminotransferase

Cu-chl : Copper chlorophyllin

L_C : Lethal concentration

L_x : Survivorship

Mg-chl : magnesium chlorophyllin

M_x : No. of eggs/ snail

ng/dl : nanogram/deciliter

ng/ml : nanogram/ milliliter

pg/ml : pictogram/milliter

Ppm : part per million

R_0 : Net reproductive rate

Ug : International unit/ gram

INTRODUCTION

Schistosomiasis is one of the public health and socioeconomic problems in several developing countries (**Sayed *et al.*, 2008** &**WHO 2013**). It is a parasitic disease of poverty that leads to ill-health. Human infection occurs through contact with fresh water infested with the infective stage of the parasite (cercariae) during agricultural, domestic, occupational and recreational activities.

In Egypt, schistosomiasis epidemiological survey indicated *Schistosoma heamatobium* to be endemic in upper Egypt with a prevalence rate of about 7.8%, while *S. mansoni* is endemic in lower Egypt with around 36.4% prevalence rate (**Elbaz** & **Esmat**, **2013**). Also, a recent study on mapping of *S. mansoni* prevalence in the Nile Delta, Egypt using the circulating cathodic antigen urine assay (urine- CCA) revealed that the overall rate of this parasite in the 5 tested governorates was 10.7% (4.7 % to 17.6 %) (**Haggag *et al*, 2017**).

It was stated that the prevalence of schistosomiasis is increased as a result of creating new breeding sites for the snail intermediate hosts of the parasite by the construction of dams and introducing irrigation canals and drains for agricultural and domestic practices (**Ali**, **2011**).