Parasitological &Ultrastructural study of the effect of Probiotics, Oregano oil and *Quillaja saponaria* on Isolated *Blastocystis hominis*

Thesis

Submitted for fulfillment of Master Degree in

Basic Medical Sciences (Parasitology)

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(2015)

بسم الله الرحمن الرحيم

To my dearly beloved parents

To my husband

To my sisters and brother

To my firend Dr.Rasmia

without their everlasting love,

encouragement & sacrifices, this

work would never have been

completed

Abstract

Blastocystis is a protozoan parasite that inhabits the human intestinal tract. Various epidemiological surveys have recorded 50-60% prevalence in developing countries. Nitazoxanide is a commonly used drug in treatment of *Blastocystis* infection especially in metronidazole treatment failure. However, undesirable side effects and treatment failures were reported.

To investigate the effect of probiotics, Oregano oil and *Quillaja saponaria* (*QS*) as natural compounds against isolated *Blastocystis* in comparison to nitazoxanide , fresh stools samples positive for *Blastocystis* were processed for in vitro cultivation using locke serum media. Three criteria were used to test the drug's efficacy, Living cell count (LCC), Living cell rate (LCR) and ultra-structure changes as seen by transmission electron microscope (TEM).

All the tested compounds used at higher concentrations showed a significant reduction in both LCC and LCR with p value< 0.001 and significant ultra-structural changes as seen by TEM. The tested compounds were arranged according to their LCR % on day one as follows: *QS* (1000 µg/ml) (47.1%), oregano oil (3200µg/ml) (49.5%), probiotics (500µg/ml) (57.0%) and nitazoxanide (0.776µg/ml) (62.5%).

QS, oregano oil and probiotics are promising new herbal therapeutic agents against *Blastocystis*.

Key wards: *Blastocystis*, probiotics, oregano oil, *QS*, LCC, LCR, TEM.

Content

ACKNOWLEDGEMENT

The making of this MSc thesis has been a challenging, exciting and educational experience both professionally and personally.

The study is based on both laboratory and imaging results and could not have been carried out without the help of numerous persons whom I wish to thank for their efforts and support throughout the study.

I would like to express high appreciation and my deepest gratitude to **Prof. Dr. Mona Mahmoud Ali**, Professor of Parasitology and Head of Parasitology Department, Faculty of Medicine, Cairo University, for her generous support and encouragement to achieve this work.

I deeply thank my mentor and supervisor, **Prof. Dr. Fadia Mohammed Anwar Amin**, Professor of Parasitology, Faculty of Medicine, Cairo University. She had set the plan, followed the steps of the work and critically discussed the results, making this thesis would not have been possible without her expert knowledge and support.

I would like to express my gratitude and appreciation toward **prof. Dr. Neimat Moussa Amer**, Professor of Parasitology, TBRI, for her extremely valuable guidance, constant encouragement, kindness, and cooperation to achieve this work.

I offer my deepest appreciation to **Dr. Nahed Fouad Farrag**, Lecturer of Parasitology, Cairo University, for her great help, support, constructive criticism and cooperation to achieve this work.

I owe special thanks to **Prof. Dr. Zeinab Hassanein Fahmy**, Professor of Parasitology, TBRI, for providing facilities, valuable advices and indispensable help throughout the parasitological work.

I would like to thank **Dr. Magda Azmi**, Lecturer of Electron Microscope for her help and cooperation throughout the Electron Microscope work.

I would like to thank all the staff members in Parasitology department in both TBRI and faculty of medicine, Cairo University for their encouragement and cooperation throughout the work.

My deepest appreciation and inexpressible gratitude to my family for their never ending support and care.

This work was done by and for the sake of patients, May Allah alleviate their suffering and accept our honest intention to dedicate this work for the sake of their own benefit. I hope this work offers a chance for a better state of health which they deserve after their long pains and suffering.

List of Abbreviation

AAD	Antibiotic-associated diarrhea
ACE	Angiotensin Converting Enzyme
AFT	Acid Fast Trichrome
B. hominis	Blastocystis hominis
B. ratti	Blastocystis ratti
CaCl2	Calcium chloride
CD	Cluster of differentiation
CDAD	Clostridium difficile associated diarrhea
CDC	Centers for Disease Control and prevention
CV	Central vacuole
CW	Cyst wall
EC	Eosin-brilliant cresyl blue
ELISA	Enzyme linked immunosorbent assay
EM	Electron microscope
er	Endoplasmic reticulum
ESEM	Environmental scanning electron microscope
FL	Fibrillar layer
gly	Glycogen
GM-CSF	granulocyte-macrophage colony-stimulating factor
gr	Granules
HIV	Human immunodeficiency virus
IBS	Irritable bowel syndrome
IFA	Indirect fluorescent antibody
IgA	Immunoglobulin A

IgE	Immunoglobulin E
IgG	Immunoglobulin G
IL	Interleukin
Iron Hx	Iron hematoxylin
KCl	Potassium chloride
keV	Kilo electron volt
KH2PO4	Potassium di hydrogen phosphate
LAB	Lactobacillus
LCC	Living cell count
LCR	Living cell rate
LDL	Low-density lipoprotein
m	Mitochondria
MgCl2	Magnesium chloride
MLC	Minimal lethal concentration
MLO	Mitochondrial like organelles
Na2HPO4	Sodium phosphate dibasic
NaCl	Sodium chloride
NaHCO3	Sodium bicarbonate
NEC	Necrotizing enterocolitis
Nu	Nuclei
O.compactium	Origanum compactum
O.gratissimum	Origanum gratissimum
O.onites	Origanum onites
O.vulgare	Origanum vulgare
OsO4	Osmium-tetroxide
P value	Probability value

PCR	Polymerase chain reaction
PFOR	Pyruvate ferredoxin oxido reductase
PTA	Phosphotungisten
QS	Quillaja saponaria
r.p.m	Revolutions per minute
RCT	Randomized control study
RFLP	restriction fragment length polymorphism
SC	Surface coat
SD	Standard deviation
SEM	Scanning Electron Microscope
Spp	Species
SSU-rDNA	Small sub-unit ribosomal deoxyribonucleic acid
SSUrRNA	Small subunit ribosomal ribonucleic acid
TBRI	Theodor Bilharz Research Institute
TEM	Transmission electron microscopy
Th2	T-helper 2
TMP-SMX	Trimethoprim-Sulfamethoxazole
t-test	Student test
UCT	Ultra-cut
UVR	Ultraviolet rays
V	Vacuole
WHO	World health organization

List of Figures