بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

MONA MAGHRABY

GENE EXPRESSION STUDIES OF GENES AFFECTING HEAT STRESS TOLERANCE IN SOME POULTRY LINES

By

ESRAA IBRAHIM SEIF EL-DEIN IBRAHIM
B.Sc. Agric. Sc., (Genetics), Fac. Agric., Ain Shams University, 2012

A Thesis submitted in Partial Fulfillment
Of
The Requirements for the Degree of

MASTER OF SCIENCES
in
Agricultural Sciences
(Genetics)

Department of Genetics
Faculty of Agriculture
Ain Shams University

2021

Approval sheet

GENE EXPRESSION STUDIES OF GENES AFFECTING HEAT STRESS TOLERANCE IN SOME POULTRY LINES

By

ESRAA IBRAHIM SEIF EL-DEIN IBRAHIM

B.Sc. Agric. Sc., (Genetics), Fac. Agric., Ain Shams University, 2012

This thesis for M.Sc. degree has been approved by:

Dr. Mohammed A. Rashed **……**
Professor Emeritus of Genetics, Dean of Higher Institute for Agric. Cooperation

Dr. Eman M. Fahmy **……**
Professor Emeritus of Genetics, Faculty of Agriculture, Ain Shams University

Dr. Khaled A. Soliman ……
Professor Emeritus of Genetics, Faculty of Agriculture, Ain Shams University

Dr. Alia A. M. El-Seoudy ……
Professor Emeritus of Genetics, Faculty of Agriculture, Ain Shams University

Date of Examination: 23/ 8 / 2021.

GENE EXPRESSION STUDIES OF GENES AFFECTING HEAT STRESS TOLERANCE IN SOME POULTRY LINES

By

ESRAA IBRAHIM SEIF EL-DEIN IBRAHIM

B.Sc. Agric. Sc., (Genetics), Fac. Agric., Ain Shams University, 2012

Under the supervision of:

Dr. Alia A. M. El-Seoudy

Professor Emeritus of Genetics, Department of Genetics, Faculty of Agriculture, Ain Shams University (Principal supervisor)

Dr. Khaled A. Soliman

Professor Emeritus of Genetics, Department of Genetics, Faculty of Agriculture, Ain Shams University

Dr. Aly Zean El-Abedin Abd El-Salam (Ceased or Late)

Professor Emeritus of Genetics, Department of Genetics, Faculty of Agriculture, Ain Shams University

ABSTRACT

Esraa Ibrahim Seif El-Dein Ibrahim: Gene Expression Studies of Genes Affecting Heat Stress Tolerance in Some Poultry Lines. Unpublished M.Sc., Department of Genetics, Faculty of Agriculture, Ain Shams University, 2021.

This study was conducted to determine the effect of heat stress on heat shock protein (HSP70) and heat shock factor (HSF1), through mRNA profiling in two chicken genotypes (Fayoumi and Matrouh). Fayoumi and Matrouh fully mature chickens were divided into two groups. The control group where the two genotypes were reared at room temperature (25°C) in a 55-60% humidity atmosphere. Whereas the treatment group was subjected to heat stress at 39°C for 4 hours in a 55-60% humidity atmosphere. Six blood samples were collected randomly from each genotype to tubes containing l.0 mg/mL EDTA. Expression levels of *hsp70* and *hsf* 1 genes were used to assess the heat tolerance of the two Egyptian local genotypes. After four hours of heat exposure, the *hsp70* and *hsf1* mRNA expression analysis revealed higher expression levels in Fayoumi type as opposed to the Matrouh type. These results showed that the acquired thermotolerance is positively linked to the stress memory. Within the two genotypes, Fayoumi type exhibited the highest means for hsp70 and HSF1 productions, and therefore, the heat stress is better tolerated, which indicates that Fayoumi mortality rate might be lower genetically under heat stress.

Keywords: Mrna; *Hsp70*; *Hsf1*; Heat Stress; Thermotolerance and Mature Chicken.

ACKNOWLEDMENT

I would first like to earnestly thank the **Almighty ALLAH** who help me, illuminate the right way, facilitate the difficulties, and finally crowned this work with success.

I would like to express my special appreciation and thanks to my **professor. Dr. Alia A. M. El-Seoudy**, Emeritus Professor of Genetics, for her valuable supervision and who suggest the problem. I would like to deeply thank her for all efforts made, the given advice, continuous monitoring, and criticizing the thesis. Without her support, this work would not have appeared in this form, so for her I must be grateful forever.

I would like to offer my sincere thanks and gratitude to my supervisor **Prof. Dr. Khaled A. Soliman**, Professor of Genetics for his successful guidance, assistance, and his patience through the work period. He always monitored and evaluated the practical performance to achieve better results.

I would like to extend my thanks to **Dr. Lamiaa M. Radwan**, Associate Professor of Poultry Production for her contribution to the scientific ideas to successful completion of this work.

I would also like to offer grate thanks for the late **Prof. Dr. Ali Zean El- Abedin**, Emeritus Professor of Genetics for his guidance and scientific ideas contributed significantly to the successful completion of this work.

There are no words of gratitude and appreciation enough to thank **Dr. Mahmoud Magdy El-Mosallamy**, Associate Professor of Genetics for his many scientific assistance and distinctive design of the experiment that led to the success of this work. He was always offering guidance to walk on the right path, in addition to continuous follow-up and effective performance in the writing and completion of this thesis.

I would also like to deeply thank **Mrs**. **Hager El-Hefnawy**, Assistant Lecturer of Genetics for helping me through the practical work steps.

Last, but not least I am grateful to all my friends and colleagues who have helped me through my way in the completion of this thesis.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

8-OHdG	8-Hydroxydeoxyguanosine
AA	Arbor Acres
aa	Acetic Acid
AHS	Acute Heat Stress
AL	Ad Libitum
BJY	Beijing You chicken
BW	Body Weights
CASP6	Down Regulating Caspase 6
CAT	Upregulating Catalase
CB	Commercial Broilers
CCK	Cholecystokinin
CE	Control Exposed
ChIP	Chromatin Immunoprecipitation Assay
CHS	Chronic Heat Stress
CK	Creatine Kinase
CN	Cou Nu Hubbard
CT	Cloacal Temperature
DD	Hsp70 genotype
CT	Cycle Threshold
ED	Embryonic Days
FABP1	Fatty Acid Transporter 1
Fas	Factor Associated
GOT	Glutamic-Oxaloacetic Transaminase
GPT	Glutamic–Pyruvic Transaminase
GSH-Px	Glutathione Peroxidase
HE	Heat Exposed
HS	Heat Stress
HSE	Heat Shock Element

HSF	Heat Shock Factors
HSP	Heat Shock Protein
HSR	Heat Shock Response
IGF-1	Insulin-Like Growth Factor 1
LDH	Lactate Dehydrogenase
MOS	Mannan Oligosaccharides
mRNA	Messenger RNA
Na	Naked-Neck
NR3C1	Glucocorticoid Receptor
NR3C1	Glucocorticoid Receptor
PBMCs	Peripheral Blood Mononuclear Cells
RJF	Red Jungle Fowl
RO	Ross 508 Aviagen
rpl5	House-Keeping Gene
RR	Respiration Rate
RT-qPCR	Reverse Transcription-Quantitative Polymerase Chain Reaction
SNPs	Single Nucleotide Polymorphism
SOD	Superoxide Dismutase
SRBC	Immune Parameter
T3	Triiodothyronine
TBARS	Thiobarbituric Acid Reacting Substances
TBE	Tris-Boric-EDTA
THI	Temperature-Humidity Index
TM	Thermal Manipulation
TN	Thermoneutral
TNF	Tumor Necrosis Factor
UCP	Uncoupling Protein
VF	Village Fowl