Molecular and immunological studies on honeybee queens *Apis mellifera* (L.) and their antibacterial activity against *Paenibacillus larvae larvae*

A Thesis submitted as a partial fulfillment of the requirements for The award of the Ph.D. degree in Entomology Faculty of Science, Ain Shams University

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Approval Sheet

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ABREVIATIONS

ABS	**:**	Absorbency
AFB	**:**	American foul brood
Ab	**:**	Abacin
A. mellifera	**:**	*Apis mellifera*
AMPs	**:**	Antimicrobial peptides
bp	**:**	Base pair
BSA	**:**	Bovine serum albumin.
CBB	**:**	Coomassie brilliant blue
CFU	**:**	Colony formed unit
cm	**:**	Centimeter(s)
+ve control	**:**	Queens fed water
-ve control	**:**	Healthy queens
ct	**:**	Cycle threshold
Df	**:**	Defensin
E coli	**:**	*Escherichia coli*
DNA	**:**	Deoxy ribonuclease acid
EFB	**:**	European foul brood
H	**:**	Healthy queens
HP30	**:**	Hypothetical protein 30
hr	**:**	Hour(s).
kDa	**:**	Kilo dalton(s).
LD	**:**	Lethal dose.
LDP line	**:**	Lethal dose probability line
LPS	**:**	Lipopolysaccharidase
mg	**:**	milligram
M	**:**	Molar
µl	**:**	Microliter
µM	**:**	micromole
ml	**:**	Milliliter
Min.	**:**	Minute(s)
Mol. wt.	**:**	Molecular weight
N	**:**	Number of test replicates
PBS		Phosphate buffered saline
PCR	**:**	Polymerase chain reaction
P. l. larvae	**:**	*Paenibacillus larvae larvae*
pPo	**:**	Prophenoloxidase
RNA		Ribonuclic acid
SE	**:**	Standard error
SDS-PAGE	**:**	Sodium duodecyl sulphate-polyacrylamide gel electrophoresis

ssp.	**:**	Sub species
T	**:**	Treated queens (queens fed bacteria)
TAE	**:**	Tris-Acetate EDTA buffer
EDTA	**:**	Ethylene diamine tetra acetic Acid
UV	**:**	Ultraviolet