Faculty of Veterinary Medicine
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PCR gene detection among HARMONY collection of *Staphylococcus aureus* from bovine milk and human nasal carriage epidemiological and genetic findings

A thesis presented by

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PCR gene detection among harmony collection of Staphylococcus aureus from bovine milk and human nasal carriage. Epidemiological and genetic findings.

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Abstract

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Abstract

"PCR gene detection among HARMONY collection of *Staphylococcus aureus* from bovine milk and human nasal carriage epidemiological and genetic findings" Alaa Tharwat Abd El Monem. Cairo Univ. Fac. Vet. Med. Thesis; M.V.Sc.; Bacteriology, Immunology and Mycology, 2015.

Staphylococcus aureus (*S.aureus*) is considered one of the most important pathogens to humans and animals. The emergence of methicillin-resistant *S. aureus* (MRSA) strains and other antimicrobial agents has become a major concern .316 samples (216 from Bovine milk and 100 from nasal swabs of human) from Minia governorate were used in this study for isolation and identification of *S.aureus* from milk in healthy & diseased animals as well as from human nasal carriers, detection of the diversity between animal and human isolates by using phenotypic methods and amplification of certain genes; *coa* and *mecA* using PCR .all *S. aureus* isolates of the study (45) showed expression of *mec A* gene, although 96.77% of bovine isolates only was cefoxitin resistant by disk diffusion method so the detection of *mec A* gene is important for determination of MRSA. The 30 isolates of bovine milk showed 7 types of *coa* gene. The sizes of PCR amplicons obtained ranged from approximately 80 to approximately 640 bps. On the other hand the 14 isolates of human nasal swabs showed 6 types of *coa* gene, the size of PCR amplicons obtained after amplification of isolates from human nasal swabs ranged from approximately 80 to approximately 800 bps.it was noted that one isolate from bovine milk, identified as coagulase positive by tube coagulase test was found to be negative with PCR amplification of the gene, so the use of both phenotypic and molecular detection of *S. aureus* strains is very important. In conclusion, molecular techniques remain the most sensitive methods in detecting *S. aureus*, and with 100% accuracy in detecting MRSA. This study has shown that mastitis in the studied regions was caused by *S. aureus* strains harboring more than one *coa* genotype. This indicates that the source of infection may be transmitted from animal to human or vice versa.

Key words: *S. aureus*, Antimicrobial sensitivity, MRSA, MSSA, *Mec A* and *Coa* genes.

Dedication

My father and my mother

My brother
(Abd El–Khalek)

My sisters
(Shaimaa and Mariem)

My husband
(Mahmoud El –Lithy)

My Little baby
(Goody)

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ACVIM	American college of Veterinary Internal Medicine
AD	Atopic dermatitis
AK	Amikacin
AmX	Amoxicillin
API	Analytical profile index
AIDS	Acquired immune deficiency syndrome
bp	base pair(s)
CA-MRSA	Community- associated Methicillin-resistant *Staphylococcus aureus*
°C	Degrees Celsius
CC	clonal complex
CC398	a particular MRSA clonal complex
C.F.U	Colony forming unit
chp	Chemotaxis inhibitory protein
clfA	Clumping factor A
CLSI	Clinical and Laboratory Standard Institute
Cna	Collagen adhesin
CMT	California mastitis test
coa	Coagulase gene(Staphylocoagulase)

COAG	Coagulase gene
CoPS	Coagulase positive *Staphylococcus aureus*
CoNS	Coagulase-negative *Staphylococcus aureus*
CPS	Coagulase positive staphylococci
CV genes	Core variable genes
DA	Clinamycin
DNA	Deoxyribonucleic acid
EDTA	Ethylene diamine tetra acetic acid
entA	enterotoxin A
f	forward
fnbA	fibronectin-binding protein A
FOX	CEFOXITIN
g	gram
HA-MRSA	Healthcare-associated Methicillin-resistant *Staphylococcus aureus*
IMI	intramammary infection
L	liter
LA-MRSA	Livestock-associated Methicillin-resistant *Staphylococcus aureus*
L.F.	Left fore
L.H.	Left hind