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Molecular and conventional bacteriological techniques for identification of some bacterial pathogens associated with swollen head syndrome in broilers

A Thesis

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List of abbreviations

SHS	Swollen head syndrome
AMC	Amoxycillin/Clavulanic acid
APEC	Avian pathogenic <i>Escherichia coli</i>
ATM	Aztreonam
CAZ	Ceftazidime
CIP	Ciprofloxacin
CLSI	Clinical laboratory standardized index
CN	Gentamycin
CR	Congo Red
CRO	Ceftriaxone
CT	Colistin sulphate
CTX	Cefotaxime
DNA	Deoxy Nucleic Acid.
DO	Doxycycline
DW	Distilled Water
<i>E. coli</i>	<i>Escherichia Coli</i>
ExPEC	Extra intestinal pathogenic <i>E.coli</i>
FEP	Cefepime
FOX	Cefoxitin
G	Grams
GLU	Glucose.
H₂S	Hydrogen Sulfide.
HA	Haemagglutination
HCL	Hydrochloric acid.
IND	Indole.
INT.	Integron
MDR	Multiple Drug Resistant
MR	Methyl Red
Mg	Milligrame.
No.	Number
PBS	Phosphate Bffered Saline
PCR	Polymerase Chain Reaction.
PD	Pullorum disease
<i>Spp</i>	Species
SXT	Sulphamethoxazole/Trimethoprim
TSI	Triple Sugar Iron
VP	Voges Proskaeur
AR	Antimicrobial resistance

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Summery

Swollen head syndrome is considered to be an important avian disease in various countries. This syndrome has caused considerable losses in the avian industry because it is responsible for mortality of 3 to 4% of the birds and for reduction of 2 to 3 % at the egg production. In the present study, the prevalence of swollen head syndrome was studied in 500 broiler chickens, of which 100 were suffering from swollen head syndrome with an incidence of 200%. Identification of the causative bacterial agents was conducted focusing on *E. coli*, *pseudomonas*, *klebsiella* and *Salmonellae* isolates. The bacteriological examination revealed that out of 100 samples, 92 bacterial isolates were recovered (92%), of which 72 samples (72%) had single bacterial isolates while 20 samples (20%) had mixed two bacterial isolates. Among the recovered isolates, *E. coli* was the most prevalent isolate (n=80; 71.4%) followed by *Pseudomonas* (n=24; 21.4%), *Salmonella* spp. (n=4; 3.6%) and *Klebsiella* species (n=4; 3.6%). Antibigram of *E. coli* isolates showed high sensitivity against fosfomycine while they were highly resistant to the other antimicrobials. *Pseudomonas* isolates showed a high sensitivity against aztreonam while they were highly resistant to the other antimicrobials. Also, *Klebsiella* isolates showed a high sensitivity against fosfomycine while they were highly resistant to the other antimicrobials. Meanwhile, *Salmonella* isolates showed high sensitivity to aztreonam while they were highly resistant to the other antimicrobials. All bacterial isolates in this study (*E. coli*, *Pseudomonas*, *Klebsiella* and *Salmonellae* isolates) showed MDR for three or more antimicrobials of different categories. PCR was applied on 7 MDR *E. coli* isolates to detect 5 resistance-associated genes (*qnrA* (0%), *qnrB* (0%), *bla*TEM (100%), *bla*SHV (28.6%) and *TetA*(A) (100%)), Also 2 virulence-associated

genes (*iss* (100%) and CFAI (0%)) and pathotyping genes (*chuA* (100%) and *TspE4C2* (57.14%)). PCR was applied on 4 MDR *Pseudomonas* isolates to detect 5 resistance-associated genes (*qnrA* (0%), *qnrB* (0%), *blaTEM* (100%), *blaSHV*(0%) and *TetA(A)* (100%)), 5 virulence-associated genes (*mexR* (100%), *arr* (50%), *toxA* (100%), *phzM* (0%) and *ecfX* (100%)). PCR was applied on 2 MDR *klebsiella* isolates to detect 5 resistance-associated genes (*qnrA* (0%), *qnrB* (0%), *blaTEM* (100%), *blaSHV* (50%) and *TetA(A)* (100%)), 3 virulence-associated genes (*iutA* (100%), *fimH* and *rmpA* were 0%). PCR was applied on 2 MDR *salmonella* isolates to detect 5 resistance-associated genes (*qnrA* and *qnrB* were 0%, *blaTEM* (100%), *blaSHV* and *TetA* (A) (100%)), 5 virulence-associated genes (*pefA* (0%), *hilA* (100%), *ompA* (100%), *fimH* (0%) and *adrA* (100%)).

In conclusion, the data of the present study showed that new serovars of *Salmonella* were recovered from poultry. These *Salmonella* serovars were found to harbor many virulence encoding genes. These serovars expressed variable degrees of resistance to antibiotics and this requires regular monitoring of the isolated *Salmonella* for their antimicrobial susceptibility especially that of zoonotic importance.