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## *Abbreviation*

+ ve =	Positive
-ve =	Negative
< =	Less than
μ=	Microgram
C.F.U. =	Colony forming unite
D =	Day
W =	Week
<i>E. coli</i> =	<i>Escherichia coli</i>
EMB	Eosin methylene blue agar
Fig. =	Figure
M =	Month
ml =	Milliliter
No =	Number
Photo. =	Photograph
<i>S.</i> =	<i>Salmonella</i>
S.S	Salmonella-Shigella medium
S/C =	Subcutaneous
Spp.=	Species
T.S.I =	Tribble sugar iron
V.P. =	Voges proskauer
XLD	Xylose Lysine Desoxycholate agar

## 6. Summary

The present work studied some bacteria causing disease in young ostrich also studied the pathogenicity of some isolated bacteria in one day old chicks. To achieve this goal a total number of one hundred and nine ostrich chicks aged ranging between one day to three months of age suffering from diarrhea, respiratory manifestation and locomatory disorders were collected from different farms distributed within four provinces (El-Behera, EL-Ismailia, El-Sharkia and El-Kalyoubia). A total of 239 samples, 51 from diseased ostrich chicks and 188 samples from dead birds from heart blood, liver, intestine, bone marrow and yolk sac (if any) were cultured and submitted to bacterial examination. The isolated microorganisms were identified on the basis of their morphological, biochemical and serological characters and revealed that the total incidence of bacterial infection in all examined samples was 99.2%.

*E. coli* was the most prevalent bacterial isolate with a percentage of 38% followed by *Pseudomonas aeruginosa* (17%); *proteus species* (15.6%); *salmonella spp.* (14%); *klebseilla spp.* (10%); *Enterobacter spp.* (3%) and *Citrobacter spp.* (2.5%). From dead birds, the highest bacterial isolation was from liver followed by bone marrow, heart blood, intestine and yolk sac, respectively.

Serologically *E.coli* strains identified as O119 (41.1%), O2 (28.9%) and *E. coli* O8 and O114 (3.3%) for each, while *Salmonella spp.* identified as *S. virchow* (51.5%), *S. typhimurium* (24.2%) and *S. eschweiler* and *S. menden* (9.1%) for each. To our knowledge, this is the first time to record the isolation of *E.coli* O114; *S. virchow*; *S. eschweiler* and *S. menden* from ostrich chicks in Egypt.

On the study of the antibiogram of the isolated *E. coli* O119, *S. virchow* and *Pseudomonas aeruginosa* against different chemotherapeutic agents revealed that *E. coli* O119 was sensitive to ampicillin while it was resistant to amoxicillin, colistin, danofloxacin, norfloxacin trimethoprim, ciprofloxacin, oxalonic acid, spiramycin, cephardine, spectinomycin and clindamycin. While both *S. virchow* and *Pseudomonas aeruginosa* were found to be highly sensitive to ciprofloxacin, danofloxacin and norfloxacin.

In our study, experimental work was carried out to study the pathogenicity of isolated *E. coli* O119, *S. virchow* and *Pseudomonas aeruginosa* either alone or together in one day old chick.

A total of 160, one day old chicks, divided into seven infected groups and one control group, the birds in the group 1 inoculated per os with equal dose of 1 ml of  $3 \times 10^7$  C.F.U/mL bacterial suspension of *E. coli* O119, *S. virchow* and *Pseudomonas aeruginosa* (dose from each isolate was 0.33 ml). Chicks of groups 2, 3 and 4 were inoculated per os with 1ml of  $3 \times 10^7$  C.F.U /ml of equal dose (0.5 ml) of each of mixture of *E. coli* O119 and *Salmonella virchow*; *E. coli* and *Pseudomonas* and *Salmonella virchow* and *Peudomonas aeruginosa*, respectively. Chicks of group 5, 6 and 7 were inoculated per os with 1ml of  $3 \times 10^7$  C.F.U /ml bacterial solution of *E.coli* O119; *Salmonella virchow* and *Pseudomonas aeruginosa*, respectively.

The design of our experiment was based on three stages, stage I (Experimental infection), stage II (therapeutic stage) and stage III (post treatment and culling stage).

In stage I, in all infected groups (1-7) the birds showed depression, inappetence, diarrhoea and stunted growth in comparison with control

group with regarding to that respiratory and nervous signs were clearly observed in group 7 in which the birds inoculated with *Pseudomonas aeruginosa*

The highest mortality rate recorded in the group 3 in which the birds inoculated with both *E.coli* and *Pseudomonas aeruginosa*, also the birds in this group showed significant reduction in their body weights in comparison to those in the remaining infected groups.

The main post mortem findings were typical picture of septicaemia with congestion of blood vessels; heart; liver; lung; spleen and kidneys. enteritis; airsacculitis; enlargement of gall bladder and unabsorbed yolk sac were also observed.

In the stage II, the infected chicks of each group were subdivided into two subgroups (A untreated and B treated), the chicks of Bs (severely affected chicks) were received the sensitive antibiotics in drinking water in recommended dose for 5 consecutive days. There was reduction in the mortality rate and clinical signs showed by treated birds, started from the 2<sup>nd</sup> day of treatment.

In the stage III, the following up of the birds in this stage of the experiment revealed that, the birds in the treated subgroups recover their vitality and showed significant increase in their body weights in comparison to those in the untreated subgroups at 14, 21 and 28 days of age.

The culling was carried out into two phases phase I (at 21 days of age) and phase II (at 28 days of age).

Clinical signs, gross lesions and histopathological changes and the reisolation of inoculated microorganisms from different organs were recorded in birds of As and Bs either in phase I or phase II of culling.

The birds of infected treated subgroups B revealed less gross lesions and histopathological changes in comparison with birds of infected untreated subgroups A either in phase I or phase II of culling.

Regarding to the reisolation percentage of inoculated microorganisms from different organs, we found that the percentage of inoculated microorganisms from different organs from birds of infected treated subgroups B was less than those of infected treated subgroups A at phase I of culling (at 21days of age) while the reisolation of *Salmonella virchow* and *Pseudomonas aeruginosa* was failed from all different organs from birds of infected treated subgroups B at phase II of culling (at 28days of age).

## **7. Conclusion**

- It was concluded from the present work that the first three months of ostrich chick's life considered as the most critical period of age for it's highly susceptible to infection with pathogenic bacteria.
- The bacterial diseases of ostrich chicks may be due to one or more microorganism. Isolated bacteria were *E. coli*, *Salmonella spp.*, *Pseudomonas aeruginosa*, *proteus spp.*, *klebseilla spp.* *Citrobacter spp.* and *Enterobacter spp.*
- Isolated *E.coli* were *E.coli* O119 (highest percentage); *E. coli* O8 and O114 (lowest percentage).
- Isolated *Salmonella* species were *S. virchow* (highest percentage); *S. eschweiler* and *S. menden* (lowest percentage).
- To our knowledge the isolation of *E. coli* O114, *S. virchow*, *S. menden* and *S. eschweiler* from ostrich chicks were reported for the first time in Egypt.
- From the observation of signs, mortality, macroscopic and microscopic examination, it concluded that, the most affected group was group three in which the birds infected with both *E.coli* and *Pseudomonas aeruginosa*.
- The use of antimicrobial treatment lead to great reduction in mortalities, clinical signs, gross lesions, histopathological changes and percentage of reisolated microorganisms from different organs from treated birds .
- Finally we recommend that ostrich farms should be subjected to the veterinary supervision for correct management; diagnosis and suitable medication.