

## **Abstract:**

**Background and Aims:** Avian Pathogenic *Escherichia coli* (APEC) is associated mainly with extraintestinal diseases in chickens, turkeys, and other avian species. The most common form of these diseases is avian colibacillosis. Complement is a system of serum proteins that generate important effectors of innate immune responses. The classical, lectin and alternative pathways of the complement system consist of a cascade of proteolytic enzymes that lead to the formation of a cell lytic complex. It seems that study of approaches that APEC using them becomes systemic in body -including overcome the complement system and ability of growth in blood (circulatory system)- helps to control of the disease.

**Methods:** Blood collected from 10 Ross 308 broiler chickens and 10 Khazak chickens and transferred to laboratory on standard conditions. Serum was harvested, pooled, sterilized with 0.22  $\mu\text{m}$  syringe-driven filter and frozen at  $-70^{\circ}\text{C}$  until assay. APEC O78 strain  $\chi 1378$  were grown in an overnight culture of a LB broth. Then centrifuged and inoculated to a PG broth and when bacterial culture achieved to  $10^8 \frac{\text{CFU}}{\text{mL}}$ , diluted in 1:1000 ratio. Inactivation of serum and blocking the alternative pathway of complement activation was carried out by incubation at  $56^{\circ}\text{C}$  for 30 min and  $50^{\circ}\text{C}$  for 20, respectively. The classical and lectin pathways of complement activation were inhibited by  $\text{EGTA}+\text{MgCl}_2$ . Then  $10^4$  CFU APEC O78 and serum was challenged together in many ways from the direction of complement system and monitored for bacterial growth by an enzyme-linked immunosorbent assay (ELISA) reader at 492 nm for 6 hours, every 30 min.

**Results:** Complement system of Khazak chickens had not effective performance against APEC O78. Although that system in Ross broiler chickens inhibited bacterial growth and this inhibition can be related to any pathway of complement activation and statistical significance difference was not observed between them ( $p = .058$ ).

**Conclusion:** Findings demonstrated that serum complement system of Khazak, unlike the Ross broiler, are inefficient to APEC O78 strain  $\chi 1378$  and the bacterium may be affect internal organ more easier and the possibility of septicemia is higher, Therefore strategies for treatment and control of colibacillosis in Khazak may be differed from broiler. Furthermore it seems by this findings, we achieved more knowledge about serum complement system of broiler and Khazak against APEC.

**Keywords:** APEC, Colibacillosis, Complement system, *Escherichia coli*, Serum resistance



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**In vitro evaluation of classical/ lectin and alternative pathways of  
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against avian pathogenic *Escherichia coli*  
(APEC O78 strain  $\chi$ 1378)**

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