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TÍTULO DO TRABALHO: Experimental Models Optimization Of Escherichia Coli In Broilers Using Different Inoculation Routes And Bacterial Doses

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RESUMO:

Experimental models optimization of Escherichia coli in broilers using different inoculation routes and bacterial doses

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Intensive poultry production has significantly enhanced the efficiency of animal protein supply chains. However, this system also facilitates the spread of opportunistic pathogens such as Escherichia coli, a gram-negative bacterium from the Enterobacteriaceae family, commonly found as a commensal organism in the intestinal microbiota of birds and other animals. This study aimed to evaluate the effects of two different inoculation routes and two bacterial concentrations of E. coli into broiler chickens as an experimental model for infection studies. A total of 38 broiler chickens aged 14 days were inoculated with the reference E. coli strain serotype O78:K80:H12 (ATCC 43896). Chicks were divided into four groups

according to inoculation route and bacterial dose: G1 - intratracheal route with 1×10^8 CFU (n = 10); G2 - posterior thoracic air sac route with 1×10^8 CFU (n = 9); G3 - intratracheal route with 1×10^{10} CFU (n = 10); and G4 - posterior thoracic air sac route with 1×10^{10} CFU (n = 9). Chicks were monitored daily for clinical signs and mortality. Within 24 hours post-inoculation, two chicks from G4 group died. At 48 hours post-inoculation, three chicks from each group were necropsied, and the remaining were evaluated at 7 days post-inoculation. Air sacs, heart, and liver were collected for analysis. Tissues were fixed in 10% neutral buffered formalin for histopathological evaluation using hematoxylin and eosin (HE) staining. E. coli isolation was performed by enrichment in Brain Heart Infusion (BHI) broth at 37°C for 18–24 hours, followed by selective plating on Levine Eosin Methylene Blue (L-EMB) agar and incubation at 37°C for an additional 18–24 hours. Group G4 showed the highest frequency of E. coli isolation from air sacs (88.89%), heart (77.78%), and liver (77.78%) compared to the other groups. HE staining revealed more frequent and severe microscopic lesions in the tissues of groups G2 and G4, with emphasis on G4, mainly in the air sacs. Finally, the thoracic air sac route with a high bacterial dose (1×10^{10} CFU) resulted in greater bacterial isolation and more pronounced histopathological lesions in broiler chickens, indicating a more effective and reproducible model for E. coli experiments. Therefore, other strains may be evaluated by this inoculation route to identify a candidate that best reproduces the pathological lesions associated with the disease. These findings support the selection of optimized experimental infection models for pathogenesis studies and vaccine development targeting E. coli in poultry.

Keywords: Escherichia coli; poultry; experimental model; inoculation route; bacterial dose.

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