

Short Communication

Evaluation of Inoculation Route in the Pathogenicity of *Escherichia coli* Strains in Broiler Chicks

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ABSTRACT

In the present investigation, O₈, O₂, O₄₁, O₁₅₄ and O₇₈ serotyping of *E. coli* were chosen as representative strains to evaluate their pathogenicity using chick inoculation technique. Serotyping of isolated *E. coli* strains (carried out at the National Salmonella and Escherichia Centre, CRI, Kasuali) showed 28 different typable, 5 untypable and 3 rough serotypes. The enteropathogenicity test of five widely distributed isolates of *E. coli* viz. O₈, O₂, O₄₁, O₁₅₄ and O₇₈ serotypes indicates that O₂, O₁₅₄ and O₇₈ strains of *E. coli* are pathogenic by intraperitoneal and intratracheal route of inoculation in chicks. Out of these, O₇₈ has been found to be highly pathogenic by intraperitoneal as well as intratracheal route of inoculation.

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Escherichia coli are Gram's negative rods within the family Enterobacteriaceae, and represent a part of the normal micro flora of the intestinal tract of humans and warm-blooded animals. Due to their high prevalence in the gut, *E. coli* are used as the preferred indicator to detect and measure fecal contamination in the assessment of food and water safety. Pathogenic *E. coli* strains are distinguished from other *E. coli* by their ability to cause serious illness as a result of their genetic elements for toxin production, adhesion and invasion of host cells, interference with cell metabolism and tissue destruction (Borgatta *et al.*, 2012).

The early chick mortality in broilers is not only potential threat to broiler industry but attributes to its great economic loss. The early chick mortality is induced by many factors include diseases, and omphalitis being one of the major importance. A mortality of 26.23% in broiler chicks has been reported where 31.45% alone contributed to omphalitis (Ghodasara *et al.*, 1992) with *Escherichia coli* (*E. coli*) as a predominant organism mainly responsible for early chick mortality accounting for 56.82% of isolates (Venkanagounda *et al.*, 1996). *E. coli* has been labeled as of great economic loss worldwide in broiler industry not in terms of growth and poor feed conversion but also causing various pathological conditions. An attempt has been made in this study to analyze the pathogenicity of different *E. coli* strains using different routes of inoculation.

Twenty five day old chicks were used for each selected isolate. The culture fluid containing 107 colony forming unit of *E. coli* were inoculate intratracheally and intraperitoneally into ten chicks each. These chicks were observed for 7 days for mortality and the lesions recorded at necropsy. The survivors were sacrificed after 7 days and examined for gross lesions such as pericarditis, perihepatitis, air sacculitis, congestion of intestines, kidneys; hemorrhagic yolk sac etc. pathogenicity test was carried out as described by Rosenberger *et al.* (1985).

In the present investigation, O₈, O₂, O₄₁, O₁₅₄ and O₇₈ serotypes *E. coli* were chosen as representative strains to evaluate their pathogenicity using chick inoculation technique. Chick inoculation technique as described by Rosenberger *et al.* (1985) using intratracheal route has been widely adopted by several workers to study the enteropathogenicity of the *E. coli* isolates (Gjessing *et al.*, 1989; Sharma and Joshi, 1987; Reddy *et al.*, 1994; Sara *et al.*, 1995 and Pourbaksh *et al.*, 1997).

After inoculation of O₈, O₂, O₄₁, O₁₅₄ and O₇₈ serotypes *E. coli* into 10 chicks each by intraperitoneal route, the mortality recorded during first 7 days was 2/10, 4/10, 4/10, 9/10 and 5/10 respectively whereas by intratracheal route of inoculation the mortality recorded was 0/10, 0/10, 2/10, 2/10, and 6/10 respectively. The macroscopic alternations due to inoculation of O₂, O₁₅₄ and O₇₈ strains of *E. coli* by intraperitoneal route were severe. This included pericarditis, perihepatitis, congested intestines, hemorrhages on the serosal surfaces of the proventriculus and congestion of kidneys. O₄₁ strain of *E. coli* showed lesions of medium severity whereas O₈ strain was of mild nature. However, gross lesions after intratracheal inoculation of all the five serotypes of *E. coli* excepting O₇₈ were of very mild- to -moderate in nature. The severe pathogenic lesions through intraperitoneal route of inoculation have also been reported by Phukan *et al.* (1989). Moderate pathogenic lesions after intraperitoneal inoculation comprising of swollen pale kidneys and cloudy yellowish fluid in the abdominal cavity have been recorded by Shaw and Halvorson (1993). Though various lesions of different degrees have been reported by several workers using intratracheal route of inoculation, however, only mild lesions through this route were observed in the present study as compared to intraperitoneal route where lesions of very severe to moderate nature were observed and are in continuity with the finding of Sara *et al.* (1995).

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