

Research Article

Serotyping and antibiotic sensitivity patterns of *Escherichia coli* isolates obtained from broiler chicks in Kashmir Valley, India

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ABSTRACT

A total number of 105 isolates of *Escherichia coli* were identified, characterized and serotyped out of one hundred twenty five samples collected from yolk sac material of healthy, sick and dead chicks in Kashmir Valley, India. The typable serotypes were 97 (92.40%), the untypable serotypes were 5 (4.80%) and the rough serotypes were 3 (2.80%). Twenty eight different serotypes viz. O₂, O₈, O₂₀, O₂₁, O₂₅, O₂₆, O₄₁, O₄₅, O₅₀, O₅₁, O₇₈, O₈₇, O₈₈, O₈₉, O₉₅, O₁₀₁, O₁₀₃, O₁₀₆, O₁₀₉, O₁₁₁, O₁₂₃, O₁₅₄, O₁₅₉, O₁₇₁, and UT were recorded. Serotypes O₈ was predominant (17) followed by O₁₅₄ (14), O₄₁(13), O₁₀₃ (5), O₂₀ (5), O₅₁ (5), O₂ (4), O₂₆ (4), O₁₇₁(3), rough (3), O₈₈ (3), O₈₉ (2), O₁₀₁ (2), O₁₀₆(2), O₁₀₉ (2), O₁₅₉ (2), O₁₁₁ (2), O₇₈ (2), O₇₈ (2), O₈₇(2) and one each of O₂₁, O₄₅, O₁₂₃, O₅₀, O₂₅ and O₂₂. Drug sensitivity pattern indicated most of the serotypes of avian *E. coli* were sensitive to ciprofloxacin, norfloxacin, amikacin, pefloxacin and claramphenicol, cephalaxin has been found to be moderately effective whils maximum number of *E. coli* isolates showed resistance against cephalaxin, lincomycin, oxytetracycline, co-trimoxazole, amoxicillin and gentamycin Therefore, this disease problem can be checked by adopting judicious selection of suitable antibiotic based on antibiogram studies.

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INTRODUCTION

Escherichia coli (*E. coli*) is associated with various poultry disease manifestations viz. chronic respiratory disease, colisepticaemia, air sacculitis etc. and has been mainly responsible for omphalitis in broilers during first few days of hatching, favored by bad management and stress in growing chicks (Chauhan, 1990). The bacterium has been recovered in 70% of chicks with omphalitis (Calnek *et al.*, 1991). *E. coli* has been labeled in accounting for great economic losses worldwide in broiler industry in terms of loss of growth, poor feed conversion and mortality (Pattison, 1993; Dhama *et al.*, 2013). Considering the all these caused by *E. coli* infection and that of the isolates were found resistant to most of the selected antimicrobial drugs used in local poultry farming, omphalitis may be considered as a threat to the broiler. Therefore, in the present study, serotyping and antibiogram of various isolates of *E. coli* causing omphalitis in broiler chicks in Kashmir valley was undertaken.

MATERIALS AND METHODS

One hundred twenty five samples of yolk sac material from dead (80), ailing (16) and healthy chicks (29) were collected for isolation chicks of the Kashmir Valley from Broiler Project Hariparbath, Srinagar, were collected for isolation of *E. coli*. The bacterial isolation was carried out as per the procedure described by Edward and Ewing (1972) and Crickshanket *et al.* (1975). The *E. coli* isolates thus obtained were serotyped at National Salmonella and Escherichia Research Centre, Kasauli (Himachal Pradesh). *In-vitro* drug sensitivity of *E. coli* isolates

against 15 antimicrobials was carried out as described by Baur *et al.* (1996).

RESULTS AND DISCUSSION

Out of 125 samples collected from dead, ailing and healthy chicks, *E. coli* was confirmed in 84% (105 of the samples). Out of the 105 samples, 97 isolates were grouped under 26 different 'O' serogroups of *E. coli*. The typable serotypes were O₂, O₈, O₂₀, O₂₁, O₂₅, O₂₆, O₄₁, O₄₅, O₅₀, O₅₁, O₇₈, O₈₇, O₈₈, O₈₉, O₉₅, O₁₀₁, O₁₀₃, O₁₀₆, O₁₀₉, O₁₁₁, O₁₂₃, O₁₅₄, O₁₅₉, and O₁₇₁. Besides this, there were 3 rough and 5 untypable serotypes too. Various serotypes have been reported by several workers. The different serotypes identified were O₁, O₂, O₈, O₁₁, O₁₂, O₁₄, O₁₈, O₁₉, O₂₁, O₂₀, O₂₆, O₅₃, O₅₄, O₅₇, O₆₀, O₆₅, O₆₈, O₇₈, O₈₀, O₈₁, O₈₃, O₈₉, O₉₁, O₁₀₁, O₁₀₃, O₁₀₆, O₁₀₉, O₁₁₁, O₁₁₅, O₁₂₃, O₁₄₇, O₁₄₈, and O₁₆₂ (Ghose, 1988; Linzitto *et al.*, 1988; Allen *et al.*, 1993; Reddy *et al.*, 1994; Blanco *et al.*, 1998). Serotypes O₈ was predominant (17) followed by O₁₅₄ (14), O₄₁(13), O₁₀₃ (5), O₂₀ (5), O₅₁ (5), O₂ (4), O₂₆ (4), O₁₇₁(3), rough (3), O₈₈ (3), O₈₉ (2), O₁₀₁ (2), O₁₀₆(2), O₁₀₉ (2), O₁₅₉ (2), O₁₁₁ (2), O₇₈ (2), O₇₈ (2), O₈₇ (2) and one each of O₂₁, O₄₅, O₁₂₃, O₅₀, O₂₅ and O₂₂. The present findings do not coincide with earlier reports of Ike *et al.* (1990), Phukan *et al.* (1990) and Gowda *et al.* (1996) who opined that O₂ was predominant among different serotyping of *E. coli*. May be different topography, season and other factors favoring O₈ strains contribute to its high incidence in this region. *In-vitro* drug sensitivity results indicated ciprofloxacin, norfloxacin, amikacin, pefloxacin and claramphenicol the most effective antibiotic exhibited efficacy of 78.90, 73.70, 68.40,

60.50 and 55.30 %, respectively, against the *E. coli* isolates, Cephotaxim was found to be moderately effective while maximum number of *E. coli* isolates showed against cephalaxin (92.40%), lincomycin (97.40%), oxytetracycline (84.20%), co-trimoxazole (71.10%), amoxicillin (68.40%) and gentamycin (52.60%). Effectiveness of ciprofloxacin, norfloxacin, and pefloxacin against *E. coli* isolates from chicks has also been reported by Dasgupta *et al.* (1992). The higher efficacy of these third generation antibiotics could be attributed to their and less use in poultry industry.

Resistance of co-trimoxazole, lincomycin, oxytetracycline, and amoxicillin have been reported by many workers which may be largely attributed to the large scale and indiscriminate use of antimicrobials as feed additives and for therapeutic purposes resulting in emergence of drug resistance to various isolates (Bandhopadhyay and Dhawedkar, 1985). Lambie *et al.* (2000) has also been reported a high level of resistance to antimicrobial drugs among pathogenic isolates. Therefore, this disease problem can be checked by adopting judicious selection of suitable antibiotic based on antibiogram studies.

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