Semi-synthetic Birds with Low Antimicrobial usage Profile can Act as a Reservoir of Antibiotic Resistance (Beta Lactamase) Gene Possessing Escherichia Coli

Pratik Ghosh, Indranil Samanta*, Achintya Mahanti, Siddhartha N. Joardar, and Guru Prasad Mandal

Department of Veterinary Microbiology, West Bengal University of Animal and Fishery Sciences, 37, K.B. Sarani, Belgachia, Kolkata-700037, West Bengal, India

Abstract—*The commensal bacteria present in food animals and exposed to the antimicrobial pressure, developed survival strategies through evolutionary adaptations. Enterobacteriaceae organisms mostly produce β-lactamase enzymes to prevent the action of β-lactam antibiotics. The most clinically important β-lactamase enzyme, found in Escherichia coli are known as extended-spectrum β-lactamases (ESBLs). There are three classical ESBLs i.e. TEM (except TEM-1), SHV (except SHV-1 and 2) and CTX-M. The present study was undertaken to detect the incidence of beta lactamase gene possessing-Escherichia coli, co-resistance pattern against other antimicrobials and clonal relationship of the isolates in healthy kuroiler birds. A total numbers of 80 cloacal swabs from kuroilers were collected randomly from West Bengal, India. Use of costly antimicrobials (cephalosporins) was not practiced by the farmers. Escherichia coli were isolated and identified by standard biochemical tests and 16SrRNA-PCR. All the E. coli isolates including controls were subjected to PCR for detection of* bla_{CTX-M}, bla_{TEM} *and* bla_{SHV} *genes. By comparing the RAPD-banding pattern phylogenetic relationship among the isolates were established. All the isolates were tested for phenotypical resistance against other antibiotics. In total, 60 isolates were identified as E. coli from the studied (n=80) kuroilers. Among them, 14 (23.3%) isolates possessed one of the studied beta-lactamase genes.* bla_{TEM} *and* bla_{SHV} *were detected in 8 (13.3%) and 12 (20%) E. coli isolates, respectively. None of the E. coli isolates possessed* bla_{CTX-M}*. In phylogenetic analysis, the strains isolated from same localities with similar genetic profile were grouped into the*

ISBN-978-93-85822-49-0

same cluster. Resistance of beta-lactamse gene possessing E. coli isolates were observed most frequently against ampicillin/cloxacillin, co-trimoxazole, amoxyclav, piperacillin, ceftriaxone, tetracycline. Semi-synthetic kuroiler birds with no cephalosporin usage profile can act as reservoir of beta-lactamase gene possessing E. coli. This is the first systematic study in kuroilers for the awareness of consumers regarding transmission possibility of antimicrobial resistant E. coli from them.

ISBN-978-93-85822-49-0