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Determination of phylogenetic groups, phenotypic identification of broad-spectrum beta-lactamases, and determination of antibiotic sensitivity profiles in *Escherichia coli* isolates in diarrheal and non-diarrheic dogs

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Abstract

Escherichia coli is an important member of the Enterobacteriaceae family, that can cause disease(s) in humans and a wide range of animals, including dogs and cats. The aim of the present study was to determine the phylogenetic groups and phenotypic identification of extended-spectrum beta-lactamases (ESBL) in *Escherichia coli* isolates obtained from diarrheal and non-diarrheic dogs and to detect the antibiotic sensitivity profile of positive ESBL isolates. The cultivation of stool samples in selected environments and confirmation of the resulting isolates were obtained by performing additional biochemical tests. Determination of the phylogenetic groups was done in the isolates by the Claremont method using primers *ChuA*, *YjaA*, *TspE4.c2*, and *arpA*; Moreover, phenotypic identification of ESBL was approved by the combined disc method and the CLSI protocol. From one hundred and fifty stool samples, 182 *Escherichia coli* isolates were obtained eventually. From this number, 100 isolates were selected to determine the phylogenetic groups and phenotypic identification of ESBL-producing *Escherichia coli*. Phylogenetic analyses showed that *Escherichia coli* isolates from dogs belonged to phylogeny groups A, B_1, B_2, D and F, with prevalence rates of 39%, 42%, 4%, 9% and 6%, respectively. Also, the frequency of phylogenetic groups in diarrheal dogs was (42.3%) in group A, (38.5%) in B1, (9.6%) in D, (5.8%) in F, and (3.9%) in B2. In addition, in healthy dogs, the phylogeny groups were in (43.07%) in group B1, (39.26%) in A, (7.7%) in D, (6.2%) in F and (3.96%) in B2. Out of 100 *Escherichia coli* isolates, 31 isolates (31%) were phenotypically beta-lactamase ESBLs producers. Twelve isolates (38.7%) were related to diarrhea samples and 19 isolates (61.3%) were related to healthy dogs. The high prevalence of *Escherichia coli* isolates producing ESBL enzymes in Ahvaz district increases the risk of spread and transmission of ESBL-producing strains in the pet population and their transmission to the human population.

Key words: *Escherichia coli*, Phylogenetic group, Beta-lactamase, Antibiotic resistance, Dog, Diarrhea

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