Prevalence, antimicrobial resistance and extended spectrum β-lactamase characterization of *Escherichia coli* isolates in retail meats in Turkey

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Abstract

Extended spectrum β-lactamase (ESBL) and plasmid mediated AmpC β-lactamase (pAmpC) producing *E. coli*have been present in humans and animals for almost 20 years. ESBL-producing *E. coli* is one of the main causes of urinary tracts and blood infections which might result in serious health problems worldwide. So far, there issignificant evidence showing that food of animal origins can play a role in transmission of ESBL-producing *E. coli* to humans. Therefore, in this study, it was aimed to determine the frequency of ESBL/AmpC-producing *E. coli* in retail meats (chicken and beef) in Turkey. Of two hundred meat samples, 88 samples (chicken; n= 81/100, and beef; n=7/100) were found to be contaminated with β-lactamase-producing *E. coli*. All these isolates were tested for their susceptibility to several antimicrobials by using disc diffusion method and were further characterized for their phylogenetic groups. In addition; polymerase chain reaction (PCR) were used to identify the β-lactamase encoding (*bla*$_{TEM}$, *bla*$_{SHV}$, *bla*$_{OXA}$, *bla*$_{CTX-M}$ and*bla*$_{AmpC}$) andquinolone resistancegenes (*qnrA*, *qnrB*, *qnrS, qepA,* and *acc(6')-Ib-cr*).Of 88 β-lactamase-producing *E. coli* isolates, 84 were found to be carrier of the following genes;*bla*$_{CTX-M-1}$(n=39), *bla*$_{CTX-M-3}$ (n=5), *bla*$_{CTX-M-15}$ (n=4), *bla*$_{TEM-1b}$ (n=2), *bla*$_{SHV-12}$ (n=1), *bla*$_{CTX-M-1}$/*bla*$_{TEM-1b}$ (n=10), *bla*$_{CTX-M-1}$/*bla*$_{TEM-1b}$/*bla*$_{SHV-5}$ (n=1), *bla*$_{CTX-M-1}$/*bla*$_{CMY-2}$(n=1) and *bla*$_{TEM-1b}$/*bla*$_{CMY-2}$(n=6), *bla*$_{CTX-M-15}$/*bla*$_{SHV-12}$ (n=1), *bla*$_{CTX-M-15}$/*bla*$_{TEM-1b}$ (n=1), *bla*$_{TEM-1b}$/*bla*$_{SHV-12}$ (n=1), and *bla*$_{CMY-2}$(n=12).Varying degree of resistance to cefuroxime, nalidixic acid, tetracycline, streptomycin (40.2 and 100%) and trimethoprim-sulfamethoxazole was observed among strains. However, there was no isolate resistant to amikasin, imipenem and cefepim. We also found a significan relation between resistance to ampicillin and cefoxitinand having*bla*$_{CMY-2}$gene (P<0.05).CTX-M-15 was one of the most identified ESBLs in infected humans in Turkey and we also found this type of ESBL in retail meats in this study, suggesting that retail meats could be a one of the vehicle for this organism for human infection and thus, regular monitoring program should be applied for controlling the risk for human health in Turkey.

Key Words: ESBL, *E. coli*, chicken meat, beef meat