Prevalence and Molecular Characterization of Antibiotic Resistant Bacteria Isolated from Chicken Meats Sold in Supermarkets in Bangkok

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Food contaminated with antibiotic resistant bacteria has become a major concern worldwide from its great impact on human health. Major food exporters including Thailand would be affected by these bacteria for possibly large economy loss. We aimed to determine the prevalence of antibiotic resistant bacteria from fresh chicken meats from supermarkets in Bangkok and their molecular characteristics. Two hundred sealed packages of fresh chicken meats from supermarkets in Bangkok were collected and processed aseptically according to standard methods. The prevalence of Escherichia coli and Salmonella spp. were 53% (106/200) and 18.67% (14/75), respectively. By using Most Probable Number (MPN) technique, 56.66% of the samples (34/60) violated the limit of allowable coliform bacteria in raw chicken meat. Most E. coli and Salmonella isolates exhibited high percentage of resistance to ampicillin, gentamicin and tetracycline. PCR with specific primers to intI1 was used to determine the prevalence of intI1 among Salmonella spp. and E. coli. Class 1 antibiotic resistance integron was found in 37.74% (40/106) and 42.86% (6/14) in E. coli and Salmonella spp., respectively. Gene cassettes in class 1 integron were identified by PCR with specific primers to 5’CS and 3’CS, and confirmed by DNA sequencing. Resistance genes identified in this study were aadA2, aadA4, aadA12, aadA22, and aadA23 (for aminoglycoside resistance); dfrA5 (for trimethoprim resistance); and inuF (for lincosamide resistance). Resistance cassettes were also found in integrase negative bacteria, because dot blot hybridization has been used to confirm the presence of intI1. Identical plasmid profiles were found among integron carrying bacteria collected from either the same place or different places. Genetic relatedness among Salmonella was demonstrated by various typing methods, i.e., serogrouping, serotyping, RAPD-PCR, and Multilocus Sequence Typing (MLST). RAPD profiles I, II, and IX showed well correlation with serogrouping and serotyping results. MLST results of Salmonella isolates were ST50, ST96, ST1543, and ST1549. MLST analysis indicated an international spread of Salmonella, which chickens may be a vehicle for spreading of these bacteria. This study demonstrated that antibiotic resistant bacteria and integron elements now have been spread among food producing animals and can be spread to human through consumption of undercooked food. Antibiotic usage in both human and animals should be tighter monitored in order to limit the emergence of antibiotic resistant bacteria.

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