ESCHERICHIA COLI CARRYING CEPHALOSPORIN (BLA) AND COLISTIN (MCR) RESISTANCE GENES ISOLATED FROM BROILERS AND PIGS IN THAILAND

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Abstract. Spread of transferable mobile genetic elements (MGEs)-mediated antimicrobial resistance in human and veterinary medicine, especially of important antimicrobials in human medicine, is of global concern. Cephalosporin- and colistin-resistant Escherichia coli isolates and their MGEs-mediated resistance genes (bla and mcr) in broilers and pigs in Thailand were investigated using fecal samples (n = 45) from 4 broiler farms and 5 pig farms (5 fecal samples per farm) during 2014 - 2015. Broiler and pig farm samples were 60 and 90% resistant to cephalosporin respectively. Among cefotaxime-resistant E. coli isolates (n = 99), blaTEM was the most predominant (74%), followed by blaCMY-2 (45%), blaCTX-M-55 (32%), blaCTX-M-14 (29%), and blaSHV (2%); 73% of isolates harbored multiple gene types. Among mcr-positive E. coli isolates (n = 15) from broiler and pig farms, mcr-1, mcr-2, mcr-3, and mcr-2 + mcr-3 were present in 33, 7, 53, and 7% of the samples; except for one isolate, the remainings were also resistant to cefotaxime. Five bla- and mcr-positive isolates exhibited co-transfer of the genes in conjugation experiments. To the best of our knowledge, this is the first study to report mcr-2-positive isolates in a non-European country.

Keywords: AmpC, cephalosporin resistance, colistin, ESBL, mcr-1, mcr-2, mcr-3