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21086 | From farm-to-fork: occurrence of persistent multidrug-resistant and copper-tolerant *Klebsiella pneumoniae* clones in poultry farms

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Abstract

BACKGROUND: *Klebsiella pneumoniae*-Kp is a clinically-relevant but neglected multidrug-resistant-MDR bacteria at the One Health interface. Studies on poultry production to depict factors contributing to Kp selection/persistence remain scarce. Here we evaluated Kp occurrence and diversity among chicken flocks, its environment and derived meat produced in 7 intensive farms-FA where copper-supplemented feeds are widely used.

METHODS: Fourteen flocks-FL were sampled in 3 stages (2022): P0=one-day-old chicks and P1=clean poultry-houses, P2=pre-slaughter chickens and P3=meat/slaughterhouse. Samples (before/after enrichment were plated in SCAI. After identification-PCR, the isolates were screened for Cu tolerance-CuT (MICCuSO4-0.25-36mM/anaerobiosis), CuT silA gene and antibiotic (disk-diffusion/microdilution) susceptibility. Clonality was assessed by FTIR spectroscopy/wzi sequencing and whole-genome sequencing to infer MLST+cgMLST (Pathogenwatch).

RESULTS: Kp (n=99) was detected in 43%-n=24/56 of samples, most from P2 (n=11FL/6FA) compared to P0 (n=1FL), P1 (n=5FL/4FA) and P3 (n=7 meat batches/7FA). The K-types most dispersed were KL111 (n=16; P2/P3; 4FL/3FA), KL10 (n=11; P0/P1/P2; 4FL/4FA), KL19 (n=9; P2; 2FL/1FA) and KL109 (n=7; P1/P2; 2FL/2FA). WGS (n=21) assigned Kp to 16 STs, including global successful clones as ST11, ST15, ST147, ST280 and ST307. cgMLST analysis confirmed the presence of genetically-related clones in P1+P2 or P2+P3. More than 50% of the samples contained Kp-MDR and Kp-silA+ (MICCuSO4>16mM).

CONCLUSIONS: Poultry production are a source of a high diversity of Kp clones, including MDR+CuT ones that persist variably between farms and stages. CuT associated with MDR may contribute to the selection of certain strains/clones at pre-slaughter stage, whose impact for food safety needs to be further explored.

Keywords: Antimicrobial resistance, food safety, environment, poultry-production.

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