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**Reduction of AMR in broiler chickens and their environment by the UPWr\_E124 phage cocktail**

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**Abstract:**

**Background/Objective:** The emergence and persistence of antimicrobial resistance (AMR) remains a pressing issue in poultry production. On the other hand, the spread of resistant strains from poultry farms to the environment is a great concern in the One Health approach. One of the potential applications to combat AMR is the usage of viruses naturally and specifically infecting bacteria called phages, proposed as an important tool in biocontrol. UPWr\_E124 phage cocktail effectively combated avian pathogenic *E. coli* causing colibacillosis. The study aimed to examine the effectiveness of the UPWr\_E124 phage cocktail in the reduction of the number of *E. coli* resistant to β-lactams, polymyxins, fluoroquinolones, aminoglycosides, sulfonamides, and tetracyclines in broiler chickens and their environment. A study financed by JPIAMR (UMO-2021/03/Y/NZ7/00138).

**Methods:** The UPWr\_E124 phage cocktail anti-AMR efficacy was tested in broiler experimental flocks consisting of 150 birds reflecting the herd density of 39 kg/m2, ensuring AMR transfer between birds similar to commercial flocks. An untreated flock was as a control and ran in parallel to the experimental flock treated with the UPWr\_E124 phage cocktail. In feces, litter and stored manure samples, the number of *E. coli* resistant to cefotaxime, enrofloxacin, colistin, gentamicin, tetracycline and sulfamethoxazole with trimethoprim was estimated.

**Results:** UPWr\_E124 phage cocktail exhibited a reduced number of total *E. coli* in feces and litter by 1.9 and 2.2 log10 CFU/g, respectively. This reduction was accompanied by the significant reduction of the number of *E. coli* resistant to all tested antibiotics in litter and cefotaxime, enrofloxacin and colistin in feces.

**Conclusion:** The UPWr\_E124 phage cocktail exhibited great potential to be an effective tool in decreasing the number of resistant *E. coli* in broiler chickens feces, litter and stored manure. Therefore UPWr\_E124 could be considered as an anti-AMR agent strongly reducing transfer of resistant strains from poultry farms to the environment.

**Keywords:** phages, *Escherichia coli*, AMR