Angèle Eraud

Plant-derived compound and oxytetracycline: a combination against avian pathogenic Escherichia coli (APEC)

Resume:

Avian colibacillosis, caused in particular by avian pathogenic Escherichia coli (APEC) strains, is a major problem in poultry production. The frequent use of antibiotics can promote the emergence of resistant APEC strains, underscoring the importance of seeking complementary or alternative strategies. Plant-derived compounds represent a promising avenue due to their antimicrobial potential and their ability to be combined with antibiotics.

This study aims to evaluate, in vitro, the interaction between a plant-derived compound and oxytetracycline (OTC) against various APEC strains. The minimum inhibitory concentrations (MICs) of OTC and the plant-derived compound were first determined individually for each strain. The two compounds were then combined to evaluate their interaction using the fractional interaction coefficient (FICI). This approach allows for a comparison of the activity of the compounds when used alone versus when combined.

Seven APEC strains with different antimicrobial resistance profiles were evaluated. The MIC of the plant-derived compound was 7,800 µg/mL for all strains, while the MICs of OTC ranged from 4 to 512 µg/mL depending on the strain. The FICI values obtained ranged from 0.12 to 0.63. According to the thresholds used in the study, values below 0.5 indicate a synergistic effect, while values between 0.5 and 1 indicate an additive effect. The results thus show a synergistic interaction for several strains and an additive interaction for the others.

These results highlight a favorable interaction between the plant-derived compound and oxytetracycline against the APEC strains studied. This combination could represent a promising strategy to explore for improving the control of avian colibacillosis by reducing the use of oxytetracycline. Further research will be necessary to better characterize this interaction and evaluate its relevance under in vivo conditions.