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**Vaccination assessment of broiler flocks to control the development and spread of resistant *E. coli* from poultry into the environment**

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**Abstract:**

**Background/Objective:** Antimicrobial-resistant bacteria originating from poultry farms represents an ongoing challenge due to its potential spread to the environment, food chain and eventually affecting human health. Therefore, the need arises to investigate intervention measures. In this context, we evaluated a live *E. coli* vaccine on its competitive exclusion potential to reduce the colonization of broilers with Extended-Spectrum Beta-Lactamase (ESBL) and plasmid-mediated AmpC Beta-lactamase (pAmpC) producing *E. coli*.

**Methods:** ESBL-/pAmpC- negative broilers (Ranger Gold, n=168) were divided into six groups (3 x n=46 experimental groups incl. positive control; 3 x n=10 control groups incl. negative control), maintaining a stocking density of 21 kg/m2, environmental enrichment, water and feed ad libitum. On the initial day of life, experimental group one underwent vaccination through spray administration, whereas experimental group two received the vaccine via drinking water on day five of life. All animals within the experimental groups were orally co-colonized with 102 cfu ESBL-*E. coli* (ST410, *bla*CTX-M-15) and pAmpC-*E. coli* (ST10, *bla*CMY-2/*mcr*-1) on day three. Control groups solely receiving the vaccine and were uncolonized by challenge strains. Cloacal swabs were used to evaluate colonization throughout the trial. After a fattening period of 49 days, samples from the colon and cecum will be obtained for quantification of challenge strains.

**Results:** Preliminary findings show an immediate broiler colonization by the vaccine strain after vaccination. Spray vaccination reduced the prevalence of ESBL-*E. coli* from 41% to 11% and for pAmpC-*E. coli* from 41% to 28% compared to control group, 24 hours after oral colonization with challenge strains. No initial ESBL-/pAmpC- reduction was observed after drinking water vaccination.

**Conclusion:** Administration of live *E. coli* vaccine before broiler colonization with ESBL-/pAmpC- *E. coli* can act as a competitive exclusion method in early stages of life. Nonetheless, integrating supplementary interventions is essential for effectively reduce their prevalence.

**Keywords:** Antimicrobial resistance, broiler chicken, Escherichia coli, ESBL, pAmpC, vaccination