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Control of *E. coli* O157:H7 in corn silage under anaerobic and aerobic conditions: Effectiveness and mode of action of bacterial inoculants.

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This project aimed to determine if inoculant treatment can eliminate *E. coli* O157:H7 in corn silages during or after ensiling, and if the inoculants possess and confer antibacterial activity to silages. Treatments included: 1) distilled water (control); 2) 5×10^5 cfu/g of *E. coli* O157:H7 (EC); 3) EC and 1×10^6 cfu/g of *P. pentosaceus* 12455 and *P. freudenreichii* (EC+BII); 4) EC and 1×10^6 cfu/g of *L. buchneri* (EC+LB); 5) EC and 1×10^6 cfu/g of *L. buchneri* and *P. pentosaceus* (EC+B500). Each treatment was applied in triplicate. Mini silos were opened after 3, 7, 31, and 82 d of ensiling and analyzed for pH and *E. coli* counts. Day-82 silages were also analyzed for VFA, lactate, and aerobic stability. Antibacterial activity against *E. coli* O157:H7, measured by the Kirby-Bauer technique, was evident in pure cultures of inoculants but not in extracts of inoculated silages. The pH of all silages fell below 4 within 3 days of ensiling, therefore *E. coli* was rapidly eliminated. Applying *L. buchneri* resulted in less lactate, more acetate, and greater aerobic stability. Day-82 silages were reinoculated with EC after 144 h of opening. Reinoculated Control, EC, and EC+BII silages had higher pH (4.71, 5.67, and 6.03) and *E. coli* counts (2.87, 6.73, and 6.87 log cfu/g) than *L. buchneri*-treated silages (pH < 4; *E. coli* counts ≤ 1.96 , cfu/g). In conclusion, inoculant treatment did not enhance *E. coli* elimination during silage fermentation. However, *L. buchneri* application maintained a low pH in aerobically exposed silages and thereby inhibited the growth of *E. coli* on such silages.

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