



Organic Acid Blend with Pure Botanical Product Treatment Reduces Escherichia coli and Salmonella Populations in Pure Culture and in In Vitro Mixed Ruminant Microorganism Fermentations

Ester Grilli, Riccardo Bari, Andrea Piva, Tom S. Edrington, Dipti W. Pitta, William E. Pinchak, David J. Nisbet and Todd R. Callaway

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Foodborne pathogenic bacteria can live in the intestinal tract of food animals and can be transmitted to humans via food or indirectly through animal or fecal contact. Organic acid blend products have been used as nonantibiotic modifiers of the gastrointestinal fermentation of food animals to improve growth performance efficiency. However, the impact of these organic acid products on the microbial population, including foodborne pathogens, remains unknown. Therefore, this study was designed to examine the effects of a commercial organic acid and botanical blend product (OABP) on populations of the foodborne pathogenic bacteria, Escherichia coli O157:H7 and Salmonella Typhimurium. Pure cultures (2×10^6 colony-forming units [CFU]/mL) of each pathogen were added to tubes that contained water-solubilized OABP added at concentrations of 0, 0.1, 0.5, 1, 2, 5, and 10% (vol/vol; $n = 3$). Water-solubilized OABP reduced ($p < 0.05$) the growth rate and final populations of E. coli O157:H7 and Salmonella Typhimurium in pure culture at concentrations $> 2\%$. E. coli O157:H7 and Salmonella Typhimurium were added (2×10^5 and 3×10^6 CFU/mL, respectively) to in vitro mixed ruminal microorganism fermentations that contained water-solubilized OABP at concentrations of 0, 1, 2, 5, and 10% (vol/vol; $n = 3$) that were incubated for 24 h. OABP addition reduced ($p < 0.05$) final populations of E. coli O157:H7 and Salmonella Typhimurium in the ruminal fluid at concentrations $\geq 5\%$. The acetate-to-propionate ratios from the in vitro fermentations were reduced ($p < 0.05$) by OABP treatment $\geq 5\%$. Treatments to reduce foodborne pathogens must be economically feasible to implement, and results indicate that organic acid products, such as OABP, can enhance animal growth efficiency and can be used to reduce populations of pathogenic bacteria.

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HEADQUARTERS:

Vetagro S.p.A.
Via Porro 2 42124 Reggio Emilia - Italy
info@vetagro.com
infowesteu@vetagro.com
Tel: +39 0522 186 1500
Fax: +39 0522 92 7025
www.vetagro.com

OTHER LOCATIONS:

Vetagro Eastern Europe Kft.
Váci utca 81 1056 Budapest - Hungary
infoeasteu@vetagro.com
Tel: +39 0522 186 1500
Fax: +39 0522 92 7025

Vetagro Yem Ticaret A.Ş.
Levent Mahallesi, Cömert Sokak, No: 1
Yapı Kredi Plaza C blok Kat:17 No:40-41
Ofis:16 34330 Beşiktaş - Istanbul
info@vetagro.com
Tel: +90 212 318 9059
Fax: +90 212 317 4701

Vetagro Inc.
230 South Clark Street, # 320,
Chicago, IL 60604 - USA
infousa@vetagro.com
Tel: +1 773 610 2087
Fax: +1 773 442 0131