Effects of saturated fatty acids of 6 to 12 carbons in length on spoilage microbes, zoonotic pathogens and antimicrobial resistant bacteria in air exposed corn silage

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INTRODUCTION

Aerobic exposure of silage during the feed-out phase promotes growth of spoilage as well as pathogenic and multi-drug resistant (MDR) microbes which can risk infection of food-producing animals and the foods they produce.

OBJECTIVE

It was investigated the antimicrobial activity of 6 to 12 carbon-containing saturated fatty acids added to overnight exposed corn silage.

METHODS

The fatty acids were added (0.03 g) individually or as 1:1 mixtures of C6:C8:C10:C12 or C8:C10 to 4 g of overnight exposed silage suspended in 10 mL water. Net changes in colony counts, determined as the difference between counts measured after 0 and 24 h aerobic incubation (22 ºC) of untreated and treated silage suspensions (n =3/treatment). Data were subjected to an analysis of variance.

RESULTS

Populations of wild-type total aerobes and experimentally-inoculated MDR-Staphylococcus aureus were unaffected by treatment ($P > 0.05$), decreasing on average (± SD) 0.64 ± 0.40 and 1.09 ± 0.39 log CFU/g silage, respectively.
Treatment effects ($P < 0.05$) were observed against experimentally-inoculated Listeria monocytogenes decreasing this foodborne pathogen by 0.64 log CFU/g compared to a 0.95 log /g increase in controls.
Indigenous yeast and mold, considered responsible for spoilage, were decreased 2.12 and 3.07 log10 CFU/g by the C8 and C8:C10 treatments compared to 0.40 log10 CFU/g increase in controls.
Indigenous lactic acid bacteria, considered beneficial, were decreased most potently by the C8 and C8:C10 treatments compared to controls (1.28, 0.66 and 0.37 log10 CFU/g, respectively).
Indigenous enterococci decreased in all incubations.

CONCLUSION

Results reveal that some fatty acid treatments inhibited pathogenic and spoilage microbes, yet treatment optimization is needed to avoid adverse effects against beneficial microbes.

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