

ESSENTIAL OIL COMPOUNDS AS ADDITIVES FOR REHYDRATED CORN GRAIN SILAGE

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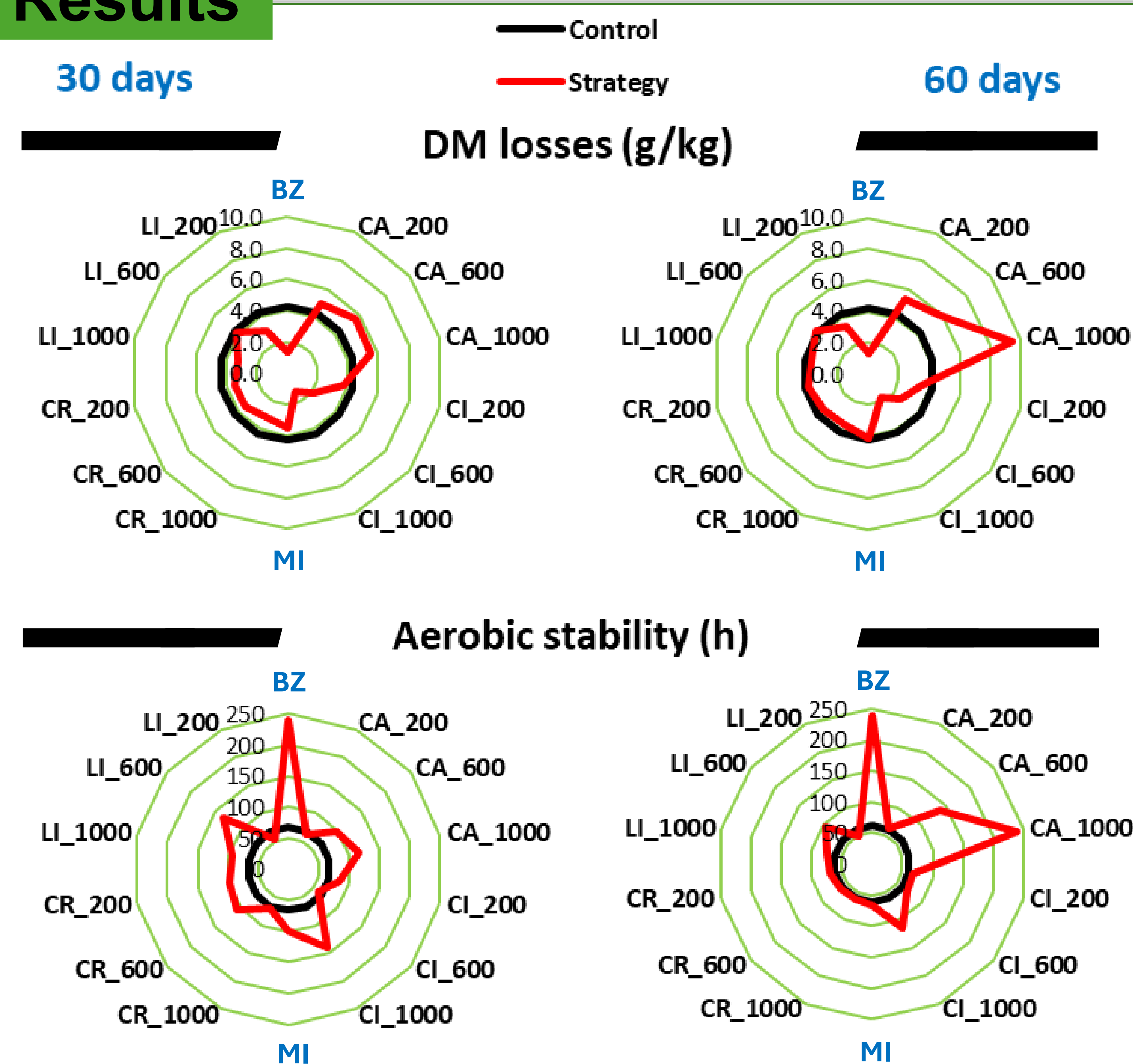
Introduction & Objective

The growing pressure to employ sustainable practices in agribusiness activities has encouraged the research on essential oils as alternative additives in silage making. Essential oils have been experimented with as additives for forage silages with promising results such as enhanced aerobic stability and improvements in conservation quality. This study aimed to identify molecular compounds isolated from essential oils (iEO) that could be promising as strategic additives for rehydrated corn grain silage (RCGS).

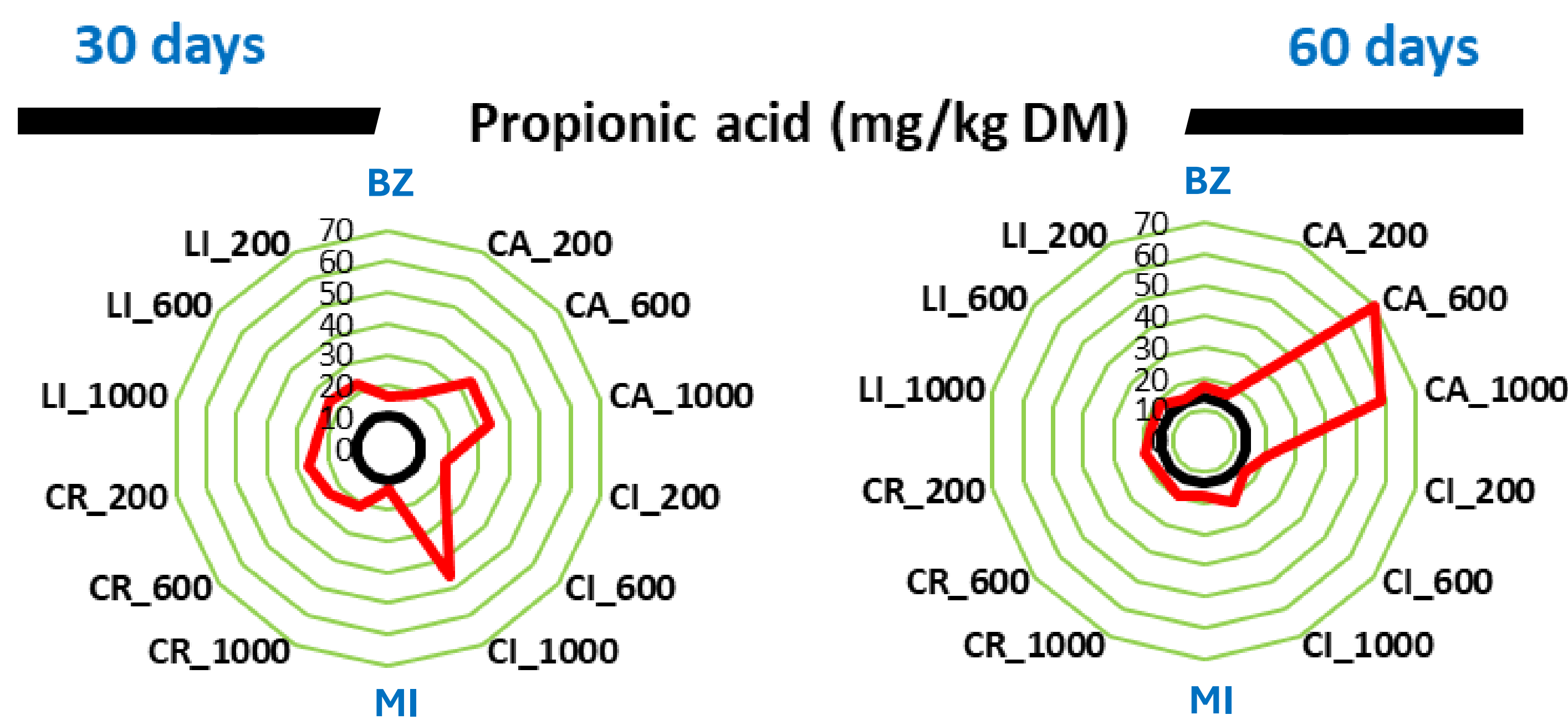
Material and Methods

Silages were made by rehydrating dry ground corn grains to 35% of moisture and packing ($> 1,000 \text{ kg/m}^3$) in 5-L plastic buckets. Treatments were prepared as a factorial arrangement of two storage times (30 and 60 d) $\times$ fifteen strategies, being: **control**; **carvacrol** (CA); **cinnamaldehyde** (CI); **D-limonene** (LI); and **citral** (CR) at **200, 600 and 1,000 mg/kg fresh matter (FM)**; **microbial inoculant** (MI) combining *L. buchneri* ($1.12 \times 10^5 \text{ cfu/g FM}$), *L. plantarum* ($9.6 \times 10^4 \text{ cfu/g FM}$) and *P. acidipropionici* ($1.12 \times 10^5 \text{ cfu/g FM}$); and **sodium benzoate** (BZ) at 2 g/kg FM. The MI and BZ strategies were considered positive controls. The RCGS were evaluated for dry matter (DM) losses, microbial counts, fermentative profile, and aerobic stability.

Results



Carvacrol decreased lactic acid production and compromised the acidification of RCGS, with the highest pH values promoted by CA_600 (4.1) and CA_1000 (4.2), which probably favored undesirable fermentations and clostridia development. The CA_1000 strategy presented an exceptionally high concentration of butyric acid (4,500 mg/kg DM). The CI_1000 strategy was effective at inhibiting yeasts and was the only strategy besides BZ capable of suppressing fungi. Both CI_600 and CI_1000 were able to decrease ethanol content in the silage.



Conclusions

Carvacrol enhanced aerobic stability with increasing doses, being able to emulate sodium benzoate when applied at 1,000 mg/kg FM in RCGS stored for 60 d, although this enhancement may be associated to the increased butyric acid production. Carvacrol, however, compromised the acidification and increased DM losses in the silo. Cinnamaldehyde decreased DM losses, being able to emulate sodium benzoate when applied at doses of 600 and 1,000 mg/kg FM. However, even the enhanced aerobic stability with the 1,000 mg/kg FM dose was not able to emulate sodium benzoate, and higher doses will be experimented in a future trial. D-limonene and citral did not promote consistent results desirable for RCGS within the doses and storage times evaluated in this study.

Acknowledgments

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