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Introduction

Corn silage is a major source of forage for lactating dairy cattle worldwide. However, corn silage can spoil rapidly when exposed to air during storage or feedout. Nowadays, several farms are storing corn silage for prolonged periods, not only as strategy to improve starch digestibility, but also to decrease the risk of forage shortage. The objective of this study was to examine the effect of a silage inoculant based on heterofermentative LAB on the fermentation and aerobic stability of corn silage stored for approximately 1.5 year.

Materials and methods

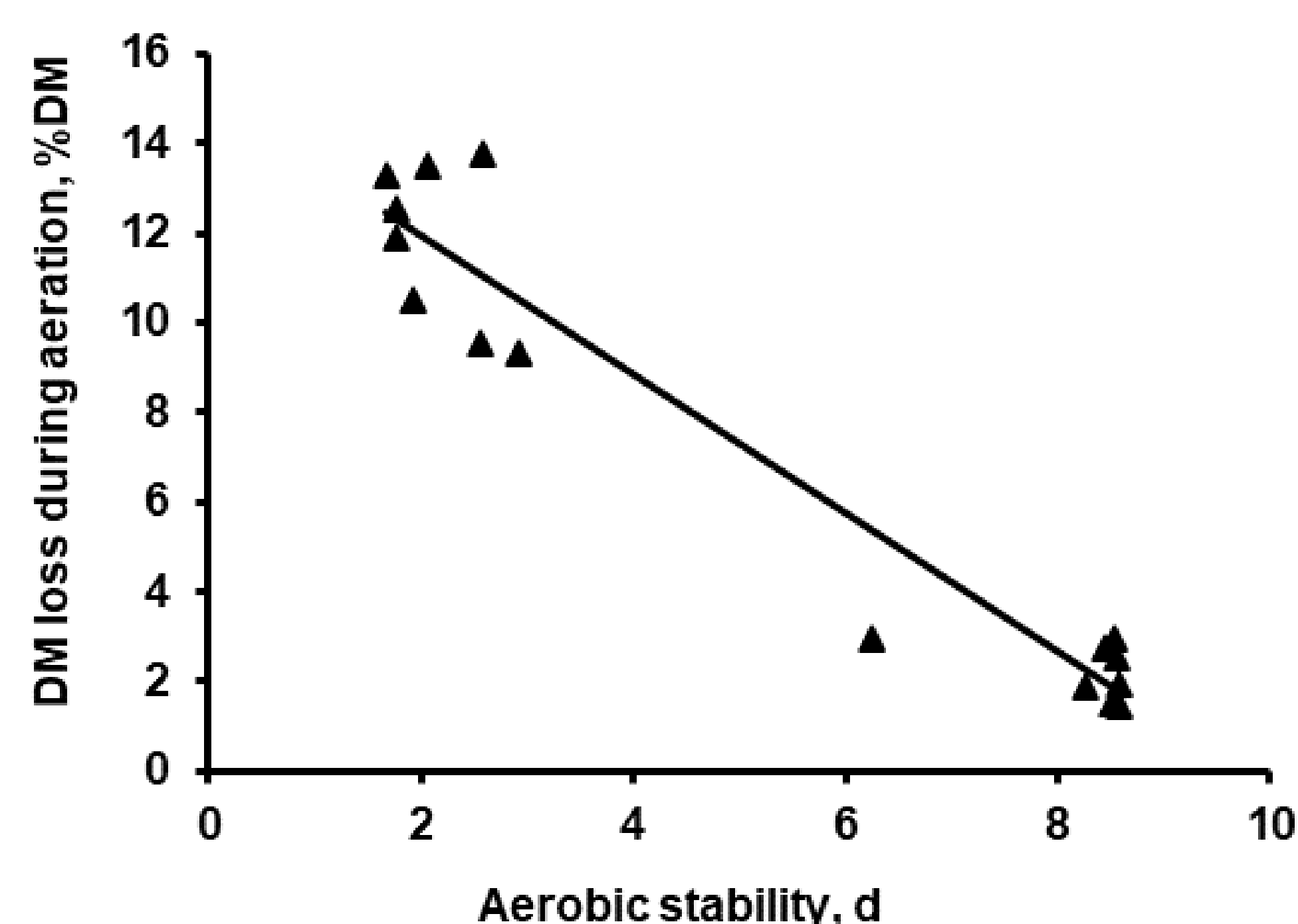
- Whole-plant corn (hybrid JM 2M91PRO3) was harvested at 3/4 kernel milk line (42% DM) from two field plots (random effect).
- The treatments were: control (**CON**) and inoculant (Magniva® Platinum 1 containing *Lentilactobacillus buchneri* NCIMB 40788 at 1.5×10^5 CFU g⁻¹ plus *Lentilactobacillus hilgardii* CNCM I-4785 at 1.5×10^5 CFU g⁻¹, **LBH**).
- After 520 d of storage, silages were sampled to measure DM, microbial counts, pH, fermentation end-products, and aerobic stability by standard methods.
- Dry matter loss was measured both during 520 d of storage and during 10 d of aeration after feedout.

Results and discussion

Table 1. Fermentation and aerobic stability of corn silage treated with heterolactic LAB inoculant and stored for 520 d (n = 8 silos per treatment)

Item	Treatment ¹		SEM ²	P-value
	CON	LBH		
Dry matter, %FM	38.2	39.0	0.68	0.001
Lactic acid bacteria, log CFU g ⁻¹ FM	6.03	7.15	0.149	<0.001
Yeasts, log CFU g ⁻¹ FM	3.73	2.71	0.211	<0.001
Molds, log CFU g ⁻¹ FM	3.78	2.95	0.236	<0.001
pH	3.67	3.57	0.046	<0.001
Lactic acid, %DM	4.87	5.36	0.365	0.001
Acetic acid, %DM	1.50	2.99	0.209	<0.001
Ethanol, %DM	1.76	0.697	0.072	<0.001
1,2-Propanediol, %DM	0.003	0.680	0.110	<0.001
DM loss during 520-d storage, %DM	7.46	5.98	0.309	0.003
DM loss during 10-d aeration, %DM	11.8	2.25	0.475	<0.001
Aerobic stability, d	2.16	8.22	0.255	<0.001

¹ CON: Without inoculant; LBH: inoculation with 1.5×10^5 CFU/g of *Lentilactobacillus buchneri* + 1.5×10^5 CFU/g of *Lentilactobacillus hilgardii*. ² Standard error of the mean.



Each day elapsed until silage temperature rise represented a reduction of 1.55%-unit in DM loss during feedout.

Figure 1. Relationship between aerobic stability (AS) and DM loss during 10-d aeration.

DM loss during aeration (%DM) = $15.1 - 1.55 \times AS$ (d);
RMSE = 1.35; R² = 0.935; P < 0.001.

Conclusion

Inoculation of corn silage with obligate heterofermentative LAB was effective in inhibiting undesirable microorganisms and reduce DM losses both during a long-term storage (520 d) and feedout phases. Reducing DM loss caused by aerobic deterioration during storage offset the amount of CO₂ produced by heterofermentative LAB metabolism.