



EFFECT OF *LACTICASEIBACILLUS HUELSENBERGENSIS* DSM 115424 ON FERMENTATION OF GRASS AND CORN SILAGE AT DIFFERENT STORAGE TEMPERATURES

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BACKGROUND & OBJECTIVE

- Climate change presenting new challenges in the form of extreme weather conditions and periods of droughts and flooding
- The favourable temperature for lactic acid bacteria (LAB) growth and multiplication in a silage is 30-35 °C
- A specially selected homofermentative LAB strain named *Lactocaseibacillus huelsenbergensis* DSM 115424 isolated from Australian grass silage at 45 °C, was published as a new species of the genus *Lactocaseibacillus* in 2023 (Grabner et al., 2023)

Aim: to investigate whether inoculation with *Lacocaseitbacillus huelsenbergensis* DSM 115424 leads to the formation of lactic acid and pH reduction in corn and grass silage at two different storage temperatures (20 °C and 40 °C)

MATERIAL & METHODS

- Silage experiments (n = 4)
- Fresh corn plants and fresh grass was ensiled in triplicate
- Following treatments were applied : (1) control (CON: no additive), (2) inoculant containing a homofermentative LAB strain (LH: DSM 115424; application rate 250,000 CFU/g FM) *L. huelsenbergensis*
- Preserving (1500 mL) jars for 3, 7 and 90 d
- The mini silos were stored constantly at 20 °C and 40 °C
- Measured parameters included: chemical composition of the fresh and ensiled corn and grass (according to VDLUFA, 2012); short chain fatty acids and PG yield via HPLC were recorded, fermentation weight losses were determined after 90 d, yeasts counts on YGC agar, lactic acid bacteria counts on MRS agar
- The data were examined by SAS evaluation including Kruskal-Wallis test for significant differences (P<0.05) between the control and the treatment group

RESULTS

- Addition of LH resulted in a greater decrease in pH after storage at both storage temperatures at all opening days
- Inoculation with LH resulted in higher concentrations of lactic acid compared to CON
- In general, the inoculation with LH resulted in higher LAB counts at all opening days (exception: day 90 at 40 °C for grass silage)

Table 1: Effect of treatment (CON or LH) on pH and lactic acid bacteria (log10cfu/g) of corn ensiled for 3, 7 and 90 d

Day	treatment	pH	lactic acid bacteria
3	CON20	4.25	8.1
3	LH20	4.15*	8.4*
3	CON40	4.06	8.3
3	LH40	3.93*	8.8*
7	CON20	3.87	8.5
7	LH20	3.62*	9.0*
7	CON40	3.90	6.9
7	LH40	3.57*	9.0*
90	CON20	3.83	7.9
90	LH20	3.74*	8.8*
90	CON40	3.76	<4.0
90	LH40	3.64*	4.2*

CON20/ LH20 = CON/ LH at 20°C storage temperature; CON40/ LH40 = CON/ LH at 40°C storage temperature; *symbolize significant differences (P<0.05)

Table 2: Effect of treatment (CON or LH) on pH and lactic acid bacteria (log10cfu/g) of grass ensiled for 3, 7 and 90 d

Day	treatment	pH	lactic acid bacteria
3	CON20	4.68	7.5
3	LH20	4.42*	8.7*
3	CON40	4.61	7.9
3	LH40	4.29*	8.8*
7	CON20	4.45	8.3
7	LH20	4.08*	8.9*
7	CON40	4.40	5.9
7	LH40	4.10*	7.9*
90	CON20	4.25	8.1
90	LH20	4.05*	8.6*
90	CON40	4.55	5.4
90	LH40	4.08*	5.0*

CONCLUSION

Inoculation with LAB improve silage quality and fermentation weight losses at warm storage temperatures and could be important for the future under warmer conditions. Consequently, silage quality foremost dependent on the choice of inoculant.

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REFERENCES
Grabner F M, Grabner H M, Schein H, Weidenholzer E, Busche T, Rückert-Reed C. *Lactocaseibacillus huelsenbergensis* sp. nov., isolated from grass silage and corn silage. Int J Syst Evol Microbiol 2023; 73(10)