Effects of a *Lactobacillus buchneri* inoculant on the fermentation profile, microbial counts, and aerobic stability of corn silage

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Introduction

With an increasing human population access to ruminant products is an important factor in global food supply, especially if ruminants use crops, not available for human nutrition. But in case of the maize crop there is given a feed/food competition. Dairy cows should be fed with high energy, nutrient rich roughage, because a high yielding cow is a climate saving cow by a lower CO2-equivalent output per milk and meat yield. The maize crop is an important crop in that matter because of combining high yields, high feed quality and a quite high water use efficacy. But due to the feed/food competition the maize must be used by a focus on the reduction of losses in silage production and during feed-out.

The hypothesis of this study was that a *Lactobacillus buchneri* based silage inoculant improve aerobic stability at tropical conditions during feed-out, by modification of the fermentation profile of a whole-plant corn crop and thus, reduce silage losses.

Material & Methods

Trial was conducted at the Experimental Farm of the University of Lavras, Brazil. The maize crop had a DM of 35%. The maize was chopped, treated and packed in 5-L laboratory silos, repeated 4 times. Treatments included: no additive (control) and addition of Kofasil S1.2 (*Enterococcus faecium, Lactobacillus buchneri*), 1 g/liter and sprayed with 1 ml/kg crop material. Control was sprayed with water. Silage was stored for 90 days at room temperature. Fermentation properties were wet chemically analysed. The aerobic stability (ASTA) was investigated from a silage subsample of 1.5 kg in linen covered polystyrene boxes (350 mm diameter and 350 mm tall) for 240 h at 25°C. Temperature was recorded via data loggers. Aerobic instability we defined as a temperature increase of more than 2°C. The weight and pH were measured at the beginning and end of 240 h period.

Table 1: Effect of Kofasil S 1.2 (KS1.2) on fermentation parameters and aerobic stability of a maize silage

	control	KS1.2
pH	3.8	3.8
lactic acid (%)	4.2	4.4
acetic acid (%)	2.3[a]	3.1[b]
ASTA (h)	56[a]	136[b]
ASTA pH after exposure	7.0[a]	4.1[b]
ASTA loss (%DM)	7.6[a]	2.8[b]

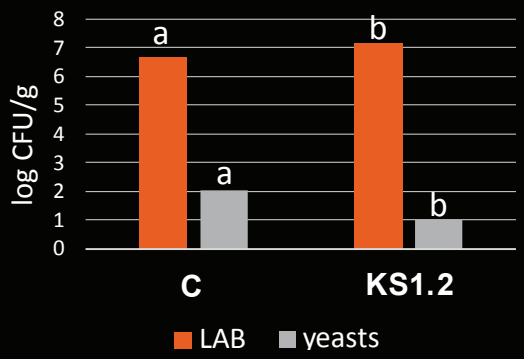

Figure 1: Effect of Kofasil S 1.2 (KS1.2) on LAB and yeast counts of a maize silage

Different letters indicate significant differences between treatments for each parameter, $p<0.05$.

Conclusion

The application of Kofasil S1.2 resulted in a clearly improvement of the aerobic stability of the silage. During the exposure to air the pH keeps stable, and the DM losses are reduced by 63% due to inoculation. These effects have come from the elevated acetic acid content in the silage.

Via the reduction of 4.8% of DM-losses an amount of 7 t CO2 is saved in case of a 100 t silage bunker.