

## **Microbiological evaluation of aerobic stability of corn silage with increasing levels of glycerin**

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**Introduction** Corn is considered the best forage to be ensiled due to its dry matter content, low buffering capacity and adequate levels of soluble carbohydrates for fermentation (McDonald et al., 1991). The use of crude glycerin as ingredient in ruminant concentrates has been studied in the last years (Gonçalves et al., 2006), but not as silage additive. When used as additive it can improve energy density and decrease total dry matter content. However there is no information about silage stability after silo opening. The objective of this work was to evaluate the changes occurring on microbial populations in corn silage containing different levels of glycerin after air exposition.

**Material and Methods** Corn silage was prepared at the experimental station of Embrapa Dairy Cattle. Twenty experimental silos were filled with corn forage containing 0, 5, 10 or 15% of glycerin on wet basis. Silos were 50 cm long, constructed with PVC tubes with 10 cm diameter. After 60 days of fermentation each silo was opened, the silage removed and put in a plastic bucket. The buckets, each one covered with one layer of cheesecloth, were kept in a room at ambient temperature. Samples of silages were collected in days 0, 4 and 8 and transferred to the following media: MRS (Himedia) for lactic acid bacteria (LAB) count and MALTE (Himedia) for fungi and yeast count. The number of colony forming units (CFU) was transformed to logarithm. A casual design with four replications was used. Treatment (0, 5, 10 and 15% glycerin) was used as plot and exposure time (0, 4 and 8 days) as sub-plots.

**Results and Discussion** Silage with 15% glycerin showed less LAB population ( $P < 0.05$ ) than silage with 0% glycerin in all times studied. Starting at the fourth day after opening, silage with 0, 5 and 10% glycerin increased the CFU number of fungi and yeast, when compared to 15%. In the eighth day, silage with 0 and 5% glycerin presented a higher number of CFU of filamentous fungi and yeast related to corn ensiled with 15% glycerin.

**Conclusion** Adding 15% glycerin to corn forage in wet basis during ensiling decrease, in the eighth day after opening, the number of CFU of lactic acid bacteria, fungi and yeast, compared to corn silage without glycerin.

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### **References**

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**Table 1.** Colony-forming units (CFU) in lactic acid bacteria growth medium (log<sub>10</sub>/g silage)

Days	Percentage of glycerin			
	0%	5%	10%	15%
0	0.04 Ba	0.034 Bab	0.018 Bab	0.008 Bb
4	0.114 Aa	0.120 Aa	0.104 Aab	0.076 Ab
8	0.126 Aa	0.128 Aa	0.120 Aa	0.072 Ab

Means followed by same letter, lowercase and uppercase letters on the same line in the same column, \* do not differ (P > 0.05).

**Table 2.** Colony-forming units (CFU) in filamentous fungi and yeasts growth medium (log 10/g silage)

Days	Percentage of glycerin			
	0%	5%	10%	15%
0	0.016 Bb	0.042 Ba	0.022 Bab	0.006 Cb
4	0.136 Aa	0.116 Aa	0.114 Aa	0.070 Bb
8	0.134 Aa	0.130 Aa	0.118 Aab	0.098 Ab

Means followed by same letter, lowercase and up-percase letters on the same line in the same column, \* do not differ (P > 0.05).