

Effect of the inclusion of glycerin on organic acids production in corn silage

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Introduction The silage is based on spontaneous lactic fermentation, where under anaerobic conditions the soluble carbohydrates are fermented with lactic acid production and rapid decrease in pH. Corn is considered the best forage to be ensiled due to its high dry matter productivity, low buffer 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; França et. al. 2012). The objective of this work was to evaluate the changes on concentrations of organic acids in corn silage occurring during the use of crude glycerin.

Material and Methods The experiment was carried out at the Embrapa Dairy Cattle, located in Juiz de Fora, MG, Brazil. Four levels of crude glycerin (0, 5, 10 and 15% wet basis) were added to corn silage and evaluated in a completely randomized experimental design with five replications. The experimental silos were polyvinyl tubes 50 cm long with 10 cm diameter with Bunsen valve in the upper cap. Sixty days after silos closure, they were opened and sampled to bromatological analyses. Organic acids were determined in a high production liquid chromatography (HPLC) coupled to an ultra violet (UV), using a wavelength: 210 nm. Data were submitted to variance and regression. The best model choice was based on the determination coefficients and the significance of regression coefficients.

Results and discussion: Crude glycerin addition to corn silage caused a negative linear effect on lactic acid concentration ($P < 0.05$) (Table. 1), with a 0.3% decrease for each 1% of glycerin addition. This result was similar to that observed by França et al. (2012). However, glycerin addition didn't affect propionic acid concentration and decreased butyric acid concentration ($P < 0.05$). For each 1% of glycerin added to silage there was a 0.26% increase in the dry matter content and that may have caused butyric bacteria inhibition.

Conclusions The addition of glycerin reduced the levels of lactic acid as well as butyric acid in corn silages.

Table 1 Regression equations and coefficients of determination (R^2) for lactic, acetic, propionic and butyric acids and dry matter of corn silages with glycerin.

Variable	Percent glycerin added to corn silage (wet basis)				Regression Equation	
	0	5	10	15		
Lactic acid (% DM)	15.9	14.69	12.32	11.66	$Y = 15,9 - 0,3011x$	$R^2 = 65.6$
Acetic acid (% DM)	6.76	5.65	4.59	4.92	$Y = 6.8 - 0.348x + 0.0144 x^2$	$R^2=55.2$
Propionic acid (% DM)	2.89	2.73	2.59	2.78	$Y = 2.9$	
Butyric acid (% DM)	3.45	2.65b	2.25	1.64	$Y = 3.37 - 0.117x$	$R^2=57.7$
Dry matter (%)	28.8	29.2	30.8	32.6	$Y = 28.41 + 0.264x$	$R^2=60.0$

References

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