Effect of tannin addition on losses and fermentation profile of soybean silage[1]

J.C. Carneiro[2] , J.S. Oliveira[2], J.C.C. Almeida[3], F.H.V. Azevedo[2], R.S. Gomes[2], P.M. Krempser[2], E.T. Ribeiro[3] , J.C.F. Lima [2], M.T. Ribeiro[2]

[1]Project financed by CNPq, [2]*Embrapa Dairy Cattle, Juiz de Fora, Brazil,* [3]*Federal Rural University of Rio de Janeiro, Departament of Animal Sciences, Seropedica, Brazil*
Email:jailton@cnpgl.embrapa.br

Introduction Silage of legumes is an alternative to increase the protein level in animal diets. Although presenting high nutritive value, legumes generally have bad characteristics for an adequate fermentation (Tabacco et al., 2006). A common practice is the use of additives to improve the quality of the ensiled material. So, the objective of this work is to evaluate the effect of commercial tannin addition on fermentation characteristics and losses during the soybean ensiling process.

Material and Methods The experiment was carried out at Santa Monica Experimental Station, of Embrapa Dairy Cattle, and the legume used was Glycine Max (L.) cv. Juliana. Plants were harvested at R6 and R7 stages and chopped using a stationary chopper. After that a sample was collected for bromatological analysis and the rest of forage used to make silages with 0, 2, 4, 6 and 8% of tannin. In the bottom of each silo, a dry sand bag previously weighted was placed to absorb the effluent and the superior cap was fitted with a Bunsen valve to allow gas escape. The content of each silo was manually compacted up the equivalent to 600 kg/m3 (original matter). Fifty six days after the ensiling the silos were opened and gas and effluent losses were calculated. Total loss was considered as the sum of gas and effluent losses. Dry matter recovery was calculated based as the percentage of total dry matter ensiled. Crude protein was determined in the silage and ammonia nitrogen in the silage extracted juice. Casual experimental design was used with five replications and the results were submitted to variance and regression. The best model choice was based on the determination coefficients and the significancy of regression coefficients using SNK at 5%.

Results and Discussion There was a quadratic effect ($P<0,05$) for all variables studied (Table 1).In order to reduce losses the best dose was 4% of commercial condensed tannin. Related to pH and ammonia nitrogen related to total nitrogen the 6% dose was more efficient. This result agree with the data of Tabacco et al. (2006), The authors included tannin in alfalfa silage and verified a better ensiling process explained by the complexion between tannin and the alfalfa protein. The progressive reduction in the protein content, however, may be explained by the tannin dilution effect once it presents a lower nitrogen concentration when compared to soybean forage. Although 6% tannin had caused a lower dry matter recovery, and consequently, lower crude protein recovered when compared to 4% addition, other parameters such as pH and ammonia nitrogen indicate that 6% level must be used.. This study, however, demands other evaluation, mainly regarding the availability of crude protein to the animal, once complexion may have occurred. .

Conclusion Soybean silage must be done with 6% of commercial tannin.

Thankfulness To FAPEMIG that supported the attendance to this event

References

Tabacco, E., Borreani, G., Crovetto, G.M., et al. 2006. Effect o chestnut tannin on fermentation quality, proteolysis, and protein rumen degradability of alfafa silage. Journal of Dairy Science. 89,:4736-4746.

Table 1 – Regression equations,coefficient of determination (R2) for effluent loss, gases loss, dry matter recovery (RDM), pH, percent of ammonia nitrogen related to total nitrogen (NH3/TN%) and crude protein (CP) of soybean silage with tannin.

	Percent tannin added to soybean silage					Regression Equation
Variable	0	2	4	6	8	
Gas loss	2.92	1.66	1.48	1.86	1.75	$Y = 2.77 -0.51X+0.05X^2$ $R^2 = 80.7$
Effluent loss	0.97	0.50	0.39	0.25	0.46	$Y = 0.96 - 0.25X+0.024X^2$ $R^2 = 97.1$
Total loss	3.88	2.16	1.88	2.11	2.21	$Y = 3.72 - 0.76X+0.74X^2$ $R^2 = 90.5$
RDM	97.2	98.3	98.5	98.1	98.2	$Y = 97.23 + 0.51X – 0.051X^2$ $R^2 = 80.7$
pH	5.59	5.56	5.54	5.27	5.27	$Y = 5.63 - 0.067X+0.008X^2$ $R^2 = 91.5$
NH3/TN%	15.6	12.6	10.7	8.3	9.5	$Y=15.77 – 1.94X + 0.14X^2$ $R^2=96.7$
CP (%)	22.7	21.9	22.3	21.0	19.4	$Y=22.50 + 0.10X – 0.59X^2$ $R^2=92.7$