Temperature evaluation on aerobic stability of corn silage with increasing levels of glycerin

J.S. Oliveira[1], R.P.X. Lopes[1], M.T. Ribeiro[1], J.C.F.Lima[1], P. M. Krempser[1], J.C. Carneiro[1].
[1] *Embrapa Dairy Cattle, Juiz de Fora, Brazil*
Email: jacksoliv@cnpgl.embrapa.br

Introduction Aerobic stability can be defined as the resistance of silage to deterioration after the silo opening (Jobim et al, 2007).After air exposition, the silage deterioration starts resulting in substantial loss of dry matter (Woolford, 1990), due to fungi and bacteria interaction activity. The temperature increase after the silo opening is consequence of the reactions promoted by filamentous fungi, yeast and aerobic bacterias (Bernardes et al. 2007). According to Driehuis et al. (2001) aerobic stability is the time for the silage, after the silo opening, to show a 1ºC increase related to ambient temperature. The objective of this work was to evaluate the effect of glycerin inclusion on the aerobic stability of corn silage.

Material and Methods Cor silage was prepared at the experimental station of Embrapa Dairy Cattle 20 experimental silos received corn forage containing 0, 5, 10 or 15% of glycerin based on wet basis. Each silo was 50 cm long, constructed from 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 room at ambient temperature. Silage and room temperatures were recorded at 8 and 15 h intervals, respectively, during 8 days (192 hours). Silage temperature was determined using a mercury thermometer put 10 cm depth in the center of silage mass. The methodology of Driehuis (2001) was used to determine the aerobic stability.

Results and Discussion During the first 39 hours there was no change in the temperature of the silos (Figure 1). After 54 hours, 40% of the silage without glycerin showed temperature 1 ºC higher than the ambient temperature meaning stability loss according to Driehuis (2001) methodology. After 72 hours, the temperature of 100% of the silages containing 0 and 5% of glycerin, and 20% of those containing 10% of glycerin exceeded 1ºC. After 87 hours, 100% of the silages containing 0, 5 and 10% of glycerin and 20% of those containing 15% of glycerin exceeded 1ºC. After 102 hours, 40% of the silage containing 15% glycerin remained stable and after 111 hour only 20%. No silage was stable after 125 hours.

Conclusion Corn silage containing 15% glycerin presented aerobic stability longer (111 hours) than silage with no glycerin (63 hours).

Thankfulness To FAPEMIG that supported the attendance to this event

References

Bernardes, T.F., Reis, R.A., Siqueira, G.R.. 2007. Estabilidade aeróbia da ração total e de silagens de capim-Marandu tratadas com aditivos químicos e bacterianos. Revista Brasileira de Zootecnia. 36(4):754-762.

Driehuis, F., Oude Elferink, W. H., and Van Wikselaar, P. G. 2001. Fermentation characteristics and aerobic stability of grass silage inoculant with Lactobacillus buchneri, with or without mofermentative lactic acid bacteria. Grass and Forage Science. 56: 330-343.

Jobim,C.C., Nussio, L.G., Reis, R.A., and Schmidt, P. 2007. Avanços metodológicos na avaliação da qualidade da forragem conservada. Revista Brasileira de Zootecnia, 36:101-119.

Woolford, M.K. The detrimental effects of air on silage. 1990. J. Appl. Bacteriol. 68:101-116.

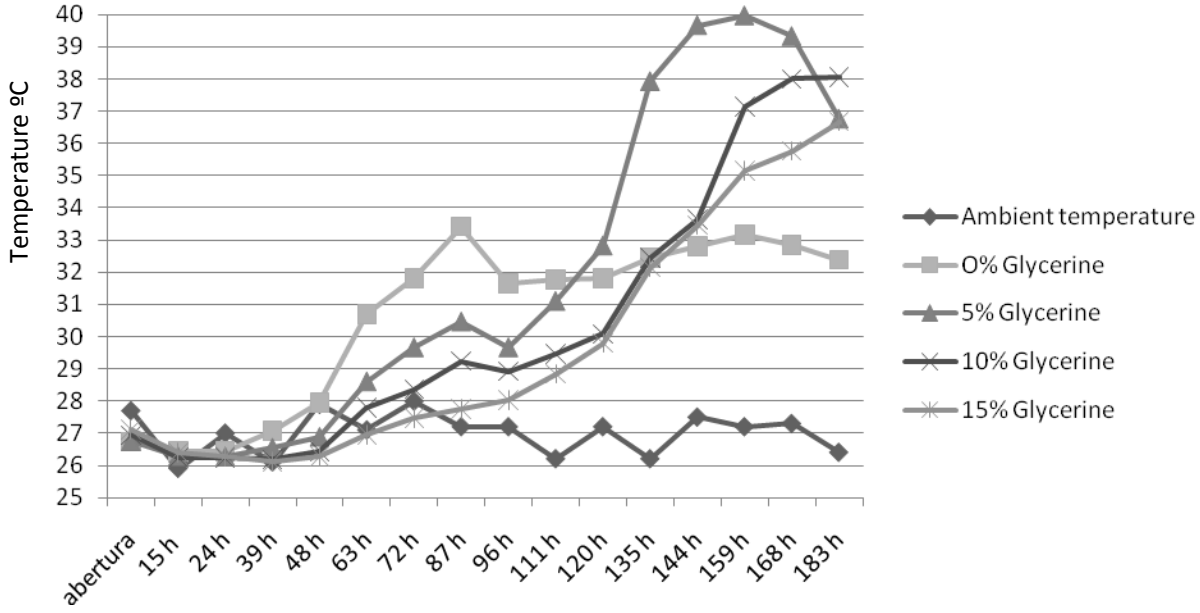

Figure 1. Temperature evolution on aerobic stability of corn silage with increasing levels of glycerin