Development of yeasts in Tifton 85 grass silage with different additives

M.A. Neres[1], M.A. Zambom[1], J. Ferraz[1], T. Fernandes[1], J.R. Stangarlin[1], D.D. Castagnara[1]
[1] *Western Paraná State University , Marechal Cândido Rondon, Paraná, Brazil. Email: marcela.neres@unioeste.br*

Introduction Tifton 85 grass takes an important place in the national livestock scenario since it is an alternative tropical forage for silage. At the silo opening, the anaerobic environment becomes aerobic (Amaral et al., 2008). This change allows microorganisms' development as yeasts, which are responsible for aerobic deterioration beginning (Woolford, 1990). Thus, this trial aimed to quantify the population of fungi before Tifton 85 grass storage as well as fungi and yeasts development after silos opening.

Material and Methods The experiment was carried out in Marechal Cândido Rondon city, Paraná, Brazil (24º 33 '40"S, 54º 04' 12"W) under a completely randomized design with four replications in subdivided plots, with four treatments and five sampling time. The treatments were: silage of Tifton 85 grass; silage of Tifton 85 grass plus soybean hulls; silage of Tifton 85 grass plus broken corn, silage of Tifton 85 grass with inoculant and silage of Tifton 85 grass with pre-drying under the sun for 2 hours. PVC silos with Bunsen valves were used. Tifton 85 was collected at 38 days of vegetative growth with a mechanical harvester at 5 cm from soil. It was chopped into pieces with an average length of 3 cm with a forage harvester machine. The proportions between soybean hulls and broken corn added to silage were based on the initial DM content of Tifton 85 to obtain 32% DM for the stored material. Forage was chopped and put under the sun for two hours for dehydration, therefore, 31.99% DM contents were obtained. For the treatment Tifton + inoculants, the used inoculant (Lacto silo Nitral Urbana-Gold ®) showed the following levels of guarantee: 1.0 x 10^9 colony-forming units (CFU/g) of *Lactobacillus curvatus*, *L. acidophilus*, *L. plantarum*, *L. buchneri*; *Pediococcus acidilactici*, *Enterococcus faecium*, *Lactococcus lactis* and cellulase 85u/g, and a 43g dilution of inoculant was used in 10 liters of water at room temperature, applied at a rate of 200 mL per 100 kg of silage with manual sprayer. Compaction densities were 236 kg of silage per m³ for Tifton 85, pre-dried under the sun and 294 kg of silage per m³ for the other treatments. Silos were opened after 30 days, while the top and bottom portions were eliminated. Samples of 300 g were placed in plastic trays and kept at room temperature for 7 days in the lab. In the 1st, 3rd, 5th and 7th days, samples were collected for yeast counting (inoculated in YEPG medium for 72 h at 28°C).

Results and Discussion Microbiological analyses of Tifton 85 grass and silage mixtures did not detect the presence of yeasts. At silos opening, yeast growth was not registered. Anaerobic conditions and organic acids concentration are two factors that affect yeasts survival during storage of silage (Bravo-Martins et al., 2006), which is provided by oxygen inside the silo (Jonsson and Pahlow, 1984). Yeasts are able to grow at low oxygen concentrations (McDonald et al., 1991) and a wide range of pH (3-8) (Lima et al., 2002). According to Woolford (1990), yeasts are also able to ferment other sugars as well as glucose, with an extra source of energy and put up with adverse effects of low pH and anaerobic conditions in silos. On the third day after silos opening, there were not any yeasts in the treatment with inoculant, however, on the treatment with soybean hulls and broken corn, there was an intense development of these microorganisms (35 and 87x10³ CFU/g, respectively). After five days of silos opening, associated with the treatments with soybean

hulls and broken corn for Tifton 85 without additives, there was yeast growth. But, one week after opening the silos, it was observed some yeast growth only for the treatments with soybean hulls and broken corn (Figure 1). The results are in accordance with Berger and Bolsen (2006), since they recommend higher rates of silos unloading to prevent silage deterioration with the presence of grains.

Conclusion Silages of Tifton 85 grass with soybean hulls or broken corn allow yeast growth after silos opening.

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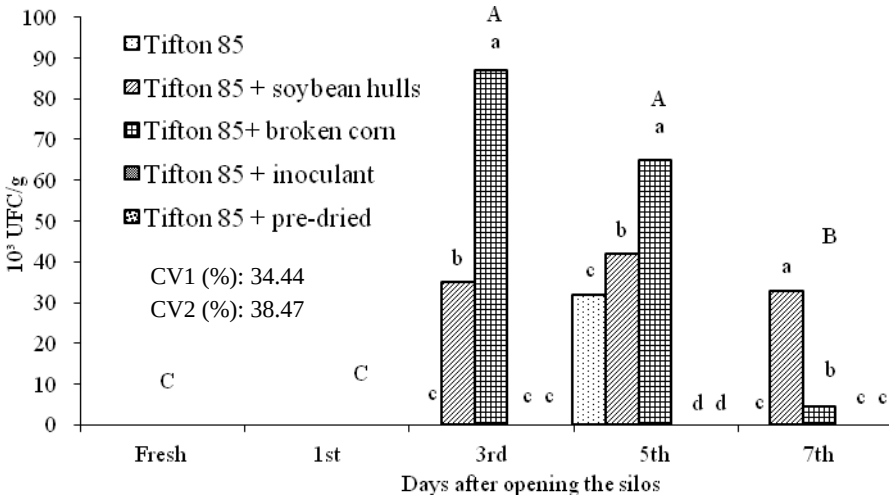

Figure 1. Yeast population in silage of Tifton 85 grass with different additives in fresh material (before ensiling) and at 1, 3, 5 and 7 days after silos opening.