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Silage of Sweet Sorghum Residues for Animal Production

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Abstract

A special sweet sorghum (*Sorghum bicolor*) cultivar has a high potential as primary material for paper production, due to its agronomic and compositional characteristics. The remaining forage parts such as leaves and panicle are by-products in Colombia, useful for animal nutrition. However, what first seemed to be the principal new business opportunity for farmers with the paper industry has meanwhile changed to a secondary income, the main benefit resulting from the animal feed. The objective of this study was to evaluate ensiling as a conservation option for sorghum residues, both under controlled and simulated field conditions. *Sorghum bicolor* ICRISAT 615 was harvested at milk-ripe stage (90 d), leaves and panicles were mixed. Two treatments (molasses alone at 33 g kg⁻¹ fresh matter (FM), T1; molasses+homofermentative *Lactobacillus* inoculum, T2) × two types of packaging (vacuum sealed bags “Rostock Model Silages”, Co; standard plastic bag wrapped in black garbage bag, Fi) were applied. Silages were stored for 30 d at 25°C and evaluated for their fermentation quality and aerobic stability afterwards. Silage dry matter (DM) ranged between 320 and 350 g kg⁻¹ FM. The pH was significantly lower in the Co silages independent of the treatment (pH 3.7 vs. 4.2), the same applied for acetic acid contents (6.9 vs. 11.8 g kg⁻¹ DM on average), explained by oxygen availability in Fi. Proteolysis expressed as ammonia-N from total N ranged from 89 to 106 g kg⁻¹ without statistical differences, with an original crude protein content of 103 g kg⁻¹ DM. Butyric acid content was slightly higher in FiT1 (47 g kg⁻¹ DM) while lactic acid was lowest in this treatment (31 g kg⁻¹ DM). Highest lactic acid content was achieved in CoT2 (57 g/kg DM), which is low compared to other forages and is explained by the low buffering capacity of sorghum (2.2 g lactic acid per 100 g DM). All silages were of good quality according to DLG (German Society for Agriculture) criteria, but showed to be prone to aerobic deterioration indicated by pH increase after 7 d and yeast infestation, except for FiT2, which was least affected. Thus, ensiling offers a good option to preserve sorghum residues provided an adequate silo size.

Keywords: Additives, leave, panicle, silage quality, *Sorghum bicolor*