Assessment of Quality and Rumen Degradability of Mixed Silages of Sugarcane Tops with Marabú Forage

RACIEL LIMA OROZCO¹, IDALMIS BELLO MORALES², EINAR ARTILES ORTEGA³, MIGUEL ÁNGEL ARCE GONZÁLEZ⁴, VEEERLE FIEVEZ⁵

¹Central University of Las Villas (UCLV), Agriculture Research Center (CIAP), Cuba
²Agriculture Ministry, Animal Health, Cuba
³Ghent University, Department of Animal Sciences and Aquatic Ecology, Belgium
⁴Central University of Las Villas (UCLV), Veterinary Medicine and Zootechnics, Cuba

Abstract

The quality and rumen degradability of sugarcane (Sacharum spp.) tops with forage of Marabú (Dichrostachys cinerea L.) ensiled in combination with either molasses, lactobacillus or fungi as well as their combination were assessed. The lab-scale silages were made in triplicate from sugarcane crop and D. cinerea fields of two years old and harvested after 12 months and 90 d of regrowth, respectively (Santa Clara, Cuba). Sugarcane tops and D. cinerea forage were mixed in a ratio of 60:40, respectively and either or not in combination or not with one of the three following additives or their combination [fungal inoculant [FI; UC1 (Penicillium sp.) + UC13 (Aspergillus sp.) or Trichoderma sp. (L6+R6b)], Lactobacillus plantarum (LAB; 3×10⁶ colony forming units/g fresh matter (FM)) and molasses (MOL; 39.4 g kg⁻¹ FM)]. Both FI were inoculated at three doses (FD; 1.5, 3.0 and 4.5 x 10⁵ spores g⁻¹ of FM) in order to prepare 28 treatments [2FI×3FD×2LAB×2MOL+4 control treatments (2LABx2MOL)]. The chemical proximate content (CPC) prior and after ensiling, as well as the ensilability and the in vitro ruminal degradability (IRD) of the silages were determined. The metabolisable energy (ME) was estimated from CPC. The ensilability parameters (pH, lactate, acetate, ammonia, ethanol) were used to select the best silages by a full factorial design in the GLM of SPSS with FI, FD, LAB and MOL as factors. The CPC, ME and IRD of the best silages were compared by one way ANOVA of SPSS (post-hoc Tukey test was performed when p < 0.05). The forages that received simultaneous addition of all additives showed the best silage quality, independently of FI or FD. However, the FD (p < 0.001) but not the FI (p > 0.05) affected the fiber fraction content and IRD of organic matter (IRDOM). The ADF content was lower (p < 0.001) and the ME content and IRDOM were enhanced (p < 0.05) in those silages with higher FD. It was concluded that mixed silages of an invasive plant and fibrous by-product inoculated simultaneously with molasses, lactobacillus and fungi at doses of 3.0 and 4.5 x 10⁵ spores g⁻¹ of FM showed the best silage quality, the lowest ADF content and the highest IRDOM, independently of fungi strain.

Keywords: Dichrostachys cinerea, ensiling, fungi, lactobacillus, molasses, rumen degradability, sugarcane tops

Contact Address: Veerle Fievez, Ghent University, Animal Sciences and Aquatic Ecology (Lanupro), Coupure Links 653, Block F, 1st floor, 9000 Gent, Belgium, e-mail: veerle.fievez@ugent.be