Introduction

In tropics, feed shortage in the dry season is an important factor that plagues livestock production. How to find new feed resources is an important issue for the revitalization of animal husbandry. In recent years, nutrient-rich woody plants have been used as new forage resources to cope with the challenges caused by feed shortages. Moringa (*Moringa oleifera* Lam.) is considered to be a representative of woody plants that can be used to replace ruminant feed. It is a perennial deciduous tree or shrub of *Moringa* family native to East Asia. It has high biomass yield and low cultivation and production costs. Its leaves have high nutritional value and contain a variety of biologically active ingredients. However, there is little information on whether the woody plant moringa can be used to prepare silage. In order to effectively use woody plants to alleviate the shortage of tropical feed, this study explored the suitability of Moringa silage.

Material and method

Moringa before flowering stage of second cutting was harvested in the experimental field of Guizhou University (Changshun, China) on August 8, 2018. The raw materials were immediately cut into 1-2 cm length and silage was prepared with 30 L polyethylene drum silo (Fig. 1). The silo was stored at ambient temperature (20–26°C), and the microbial population, chemical composition and fermentation quality of silage were analyzed after 3, 7, 15, 30 and 60 days of ensiling.

Result and discussion

The dry matter (DM) of moringa including fresh branch and leaf was 26.57%. Their neutral detergent fiber (NDF), crude protein (CP) contents were 27.40 and 20.90% on a DM basis, respectively. The carbohydrate content of moringa was 41.82% of DM (Fig. 2). The epiphytic microbial count of moringa were $10^6$–$10^7$ in colony-forming unit/g of fresh matter (FM) for aerobic bacteria, $10^4$–$10^5$ for lactic acid bacteria, coliform bacteria, and mold (Fig. 3). At 3, 7, 15, 30, and 60 days of ensiling, the contents of CP, ether extract, NDF, organic matter, and carbohydrate in all silages did not differ remarkably. The pH of silage was 4.52 at 3 day of ensiling, and it was reduced to 3.65 after 7 days of ensiling. At 60 days of ensiling, the silage was preserved well, their lactic acid were higher than 1% of FM while ammonia-nitrogen was below 3.5 g/kg of FM. The butyric acid was below the detectable level in all silages. The results indicate that the moringa can be prepared as good quality of silage, and has a potential as high protein woody feed resources for livestock.