

Effects of glycerol and chestnut tannin addition in cassava leaves (*Manihot esculenta* Crantz) on silage quality and *in vitro* rumen fermentation profiles

ABSTRACT

The effects of glycerol and chestnut tannin addition on non-ensiled and ensiled cassava leaves which were then incubated in an *in vitro* rumen system were investigated to evaluate the ensiling characteristics and fermentation profiles, respectively. Both non-ensiled and ensiled cassava leaves were prepared using laboratory-scale minisilos with 4 different treatment types of additives. The treatments were Control (cassava leaves without additive [S0]), Cassava leaves + 3% dry matter (DM) of glycerol (SG), Cassava leaves + 3% DM chestnut tannin (ST), and Cassava leaves + 3% DM glycerol + 3% DM chestnut tannin (SGT). The cassava leaves silage recorded with high concentration of lactic acid, negligible amount of butyric acid, and low concentration of ammonia-N, demonstrates a well-preserved silage quality after 4 weeks fermentation. The *in vitro* total gas production and volatile fatty acid (VFA) concentration did not differ between the treatment groups, but the *in vitro* dry matter digestibility (IVDMD) and the *in vitro* organic matter digestibility (IVOMD) increased after the ensiling process. The addition of glycerol alone or in combination with chestnut tannin showed propiogenic property in the non-ensiled cassava leaves. Chestnut tannin, when added singly or in combination with glycerol, reduced the ammonia-N and iso-VFA concentration in the ensiled cassava leaves. Furthermore, the addition of glycerol and/or chestnut tannin improved some of the silage quality and showed no detrimental effects on the *in vitro* rumen fermentation profiles.

Keyword: Cassava leaves; Glycerol; Tannin; In vitro; Rumen fermentation