

Nutrient intake, digestibility and nitrogen retention in indigenous goats fed on *Acacia nilotica* fruits treated for condensed tannins

T. Tshabalala^{1,2#}, J.L.N. Sikosana³ & E. Chivandi^{1,4}

¹ Department of Livestock & Wildlife Management, Midlands State University, P. Bag 9055 Gweru, Zimbabwe

² School of Animal, Plant and Environmental Sciences, University of the Witwatersrand, P. Bag 3, Johannesburg, 2050 South Africa

³ Department of Research and Specialist Services, Matopos Research Institute, P. Bag K5137, Bulawayo, Zimbabwe

⁴ School of Physiology, Faculty of Health Sciences, University of the Witwatersrand, 7 York Road, Johannesburg, South Africa

(Received 19 April 2012; Accepted 28 June 2013; First published online 18 December 2013)

Copyright resides with the authors in terms of the Creative Commons Attribution 2.5 South African Licence.

See: <http://creativecommons.org/licenses/by/2.5/za>

Condition of use: The user may copy, distribute, transmit and adapt the work, but must recognize the authors and the South African Journal of Animal Science.

Abstract

Polyethylene glycol (PEG 4000), Browse PlusTM (BP), wood ash (WA) and boiling water were evaluated as tannin deactivation methods on tannins in *Acacia nilotica* fruits. Twenty four Matebele goats of mean body mass, 38.7 ± 3.12 kg, were used in a digestibility and nitrogen balance trial. A completely randomized design was used, and the initial weight was used as a covariate in data analysis. The goats were randomly allocated to the treatments and were fed for 28 days on a basal diet of hay and *A. nilotica* fruits treated with PEG (MW 4000), BP, WA or boiling water. *Acacia nilotica* fruits had 4.39% catechin equivalents of condensed tannins, thus the amount of PEG, BP and WA used to treat the fruits was 1.5 parts per part of condensed tannin in the fruits. It was hypothesized that treating the fruits would deactivate the tannins in them and increase intake, digestibility and nitrogen retention. Treating the fruits for condensed tannins had no effect on hay and fruit intake. None of the treatments had an effect on the apparent digestibility of dry matter, organic matter, neutral and acid detergent fibre and nitrogen retention in the goats. The goats that were fed on the boiled fruits had a negative N retention of -1.03 g/day. It was concluded that none of the detannification methods improved feed intake, apparent nutrient digestibility and nitrogen retention. It is recommended that each detannification method should be tested on different types of tannins and at different concentrations before totally dismissing the treatments as not useful.

Keywords: Boiling, Browse Plus, pods, proanthocyanidins, PEG, wood ash

Corresponding author: tshabalala@gmail.com

Introduction

Shortage of good-quality feed, especially during the long dry season in tropical and subtropical areas, has increased the need to provide supplementary feed to maintain livestock condition (Hove *et al.*, 2001). However, there has been a drastic increase in the cost of feed in recent years owing to the economic hardships faced by most African countries. Few communal farmers can afford to buy supplementary feed for livestock, and some have resorted to collecting tree fruits and feeding them to livestock as protein supplements, especially during the dry season (Kindness *et al.*, 1999; Sikosana *et al.*, 2002). Tree fruits are especially valuable because they ripen and fall on the ground in the dry season when there is no green forage (Timberlake *et al.*, 1999). Many trees produce potentially nutritious fruits containing up to 200 g crude protein/kg (Tanner *et al.*, 1990).

Trees of the genus *Acacia*, in particular *Acacia nilotica*, with yields of about 35 kg of fruit per tree per season, contribute to the bulk of tree fruits gathered for feeding goats (Timberlake *et al.*, 1999). However, *A. nilotica* has been reported to contain condensed tannins that reduce browse utilization efficiency by herbivores (Tanner *et al.*, 1990; Phale&Madibela, 2006; Nsahlai *et al.*, 2011). Condensed tannins act as