

An evaluation of NaOH and wood ash for the inactivation of tannins in *Acacia nilotica* and *Dichrostachys cinerea* fruits using an *in vitro* rumen fermentation technique

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Tree fruits in semi-arid areas are potential sources of protein for ruminant livestock but their utilisation is reduced by the presence of antinutritional factors such as tannins. The objective of this study was to assess the potential of NaOH and wood ash solutions to inactivate tannins in tree fruits using an *in vitro* ruminal fermentation technique. In Experiment 1, aqueous sodium hydroxide solutions were applied for 12 h to ground, phenolic-rich *Acacia nilotica* and *Dichrostachys cinerea* fruits (application rates: 0, 0.5, 1.5, 2, 3 and 5 g NaOH/100 g fruit). The optimum (maximum tannin inactivation) NaOH application rate was determined over a 48 h period in an *in vitro* fermentation technique. Polyethylene glycol (PEG) was used to assess the extent to which NaOH had inactivated the tannins. *Acacia nilotica* and *D. cinerea* required 3 and 2 % of NaOH for maximum tannin inactivation; respectively. In Experiment 2, the effectiveness of wood ash for inactivating tannins in *A. nilotica* and *D. cinerea* fruits was also evaluated and compared to that of NaOH. An aqueous solution (5 ml) containing wood ash (1 g) reduced tannins in *A. nilotica* and *D. cinerea* fruits (1 g) by 75 and 96 %, respectively. In comparison, low levels of NaOH (30 mg) achieved 83 and 91 % reductions, respectively. The results indicated that alkali treatments were more effective in neutralizing tannins in *D. cinerea* fruits compared to *A. nilotica* tannins. It was concluded that wood ash, which is an inexpensive source of alkali, has the potential to improve the nutritive value of these underutilised, high-tannin feeds under smallholder conditions in Zimbabwe.

Keywords: alkaline treatments; *in vitro* rumen fermentation; sodium hydroxide; polyethylene glycol