

The effect of treated *Acacia nilotica* pods as feed supplement to pregnant indigenous Matebele goats, of Zimbabwe, grazing during the dry season

Introduction. In the dry season low quality roughages including grass, and wild fruits/pods are usually the only feeds available to livestock in semi-arid areas. Dry, ripe *Acacia nilotica* pods and other browse pods are potential protein sources for animals in the dry season. The presence of high levels of phenolics in the pods limits their utilization (Mlambo, 2002). Tannins and cynogenic glycosides do limit utilization of whole pods as protein supplements. To improve maximum utilization of browse pods, reduction or “detannification” of these secondary compounds is necessary. Methods to inactivate tannins are well documented (Mlambo, 2002). One economical and readily available source of alkaline material is wood ash (WA) solution (Nolte, et al., 1987). This method is cheap for use by poor-resource farmers as compared to other treatments such as sodium hydroxide and ammonium hydroxide which can be dangerous.

Two experiments reported here were undertaken to evaluate the potential of treated *A. nilotica* pods as feed for pregnant goats during the dry season; and to study intake and digestibility of treated pods by goats.

Materials and methods. All WA was obtained by burning dead wood around Matopos Research Station. All impurities were removed by hand. Dry, ripe *A. nilotica* pods were collected from the station area, during the months of June and July 2005. Some pods were crushed and not crushed. Pods were crushed before treatments in a hammer mill to pass through a 12 mm screen. Pods were then soaked in a fresh wood ash solution (WAS) as per treatment below: 800g of WA were mixed in a 4 litre of water; the solution was left to settle for an hour before being separated and mixed with pods. The pH of the WAS was 10.84. Pods were soaked and air-dried for 24 hours. Chemical composition of the diets are Table 1.

Experiment 1. Fifty-five indigenous Matabele goats were randomly allocated to five treatments (TRT): TRT one: pods crushed and soaked (CS) in a WAS for 16 hours; TRT two: pods (CS) in a WAS for 40 hours; TRT three: pods crushed and not soaked (CNS) in WAS; TRT four pods not crushed and soaked (NCS) in a WAS for 40 hours, and the other group did not receive a supplement (control). Animals were fed as a group, with a ration of 200g /animal/day, 45 days *pre-partum* and 45 days *post-partum*. Measurements include doe weight at kidding, kid birth weight, monthly doe and kid weights, daily milk yield and weaning weights.

Experiment 2. Twenty-five indigenous castrated Matabele goats (30kg, average live-weight) were assigned randomly (five animals per treatment) to five diets: pods crushed and soaked (CS) in a WAS for 16 hours; pods (CS) in a WAS for 40 hours; pods crushed and not soaked (CNS) in WAS; pods not crushed and soaked (NCS) in a WAS for 40 hours, and pods not crushed (NC) and not soaked (NS) in a WAS. Animals were housed individually in digestibility crates for 28 days. The experiment consisted of 21 days adaptation period before collection of faeces and urine. Collection of faeces and urine was made in the following seven days. Diet samples, hay, and faeces were analysed for total nitrogen (N) neutral –detergent fibre (NDF), acid detergent fibre (ADF) and ash. Urine was analysed for total N only. Condensed tannins were also estimated by the butanol –HCl

Table 1 Chemical composition of diets used in the above experiments

	TRT 1	TRT 2	TRT 3	TRT 4
<i>Crude protein</i>	10.88	10.47	11.80	12.62
<i>Ash</i>	12.74	14.27	5.32	5.75
<i>ADF</i>	30.04	24.86	19.20	20.83
<i>NDF</i>	37.20	34.95	26.67	28.48
<i>Soluble tannin (A500/g DM)</i>	1.61	0.72	8.57	4.42
<i>Insoluble tannin (A500/mg)</i>	0.019	0.031	0.017	0.028

Preliminary results:

Chemical composition of the diets are given in Table 1. Wood ash had an effect on the chemical composition of *Acacia* fruits. Preliminary doe weights at kidding and kid birth weights are given in Table 2. Kidding of goats is still in progress.

Table 1 Chemical composition of *Acacia* fruits, treated or not treated with wood ash solution (see text for details)

	TRT 1	TRT 2	TRT 3	TRT 4
Crude protein, g/kg dry matter (DM)	108.8	104.7	118.0	126.2
Ash, g/kg DM	127.4	142.7	53.2	57.5
ADF, g/kg DM	300.4	248.6	192.0	208.3
NDF, g/kg DM	372.0	349.5	266.7	284.8
Soluble tannin (A500/g DM)	1.61	0.72	8.57	4.42
Insoluble tannin (A500/mg)	0.019	0.031	0.017	0.028

Table 2. Doe weights at kidding and kid birth weights.

	TRT1	TRT2	TRT3	TRT4	TRT5	s.e.m
Doe weights, kg	27.63	27.1	28.13	28.8	30.13	0.22
n	8	8	8	6	4	
Kid birth weights, kg	2.64	2.32	2.45	2.9	2.12	0.19
n	8	12	11	7	6	

The study shows that wood ash can be used to reduce tannin levels during treatment of *Acacia nilotica* pods. This method is very convenient for farmers in the smallholder sector. Wood ash is readily available on daily basis in all homes. Other alternatives, which need to be investigated, is the use of sodic soils in place of ash especially in areas where deforestation is a problem.