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Effect of dietary tanniniferous *Acacia nilotica* leaf meal on productivity and methane emission in yearling Boer bucks

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Statement of the Problem: Goats play important roles in the communal areas of South Africa. However, their productivity is constrained by shortage of good quality feed, especially during the long dry season. Poor nutrition results in low productivity and death in extreme cases. Goats also emit methane (CH_4) gas which contributes to loss of dietary gross energy and global warming. There is evidence that tanniniferous feeds in the diets of ruminants, such as *Acacia nilotica* leaves, may improve goat productivity and decrease CH_4 production. However, this evidence is inconclusive.

Purpose: The purpose of this study is to determine the effect of tanniniferous *Acacia nilotica* leaf meal inclusion levels on productivity and CH_4 emission in yearling Boer bucks.

Materials & Methodology: Twenty-four yearling Boer bucks with an average live weight of 23±2 kg were allocated, in a completely randomized design, to four dietary treatments containing *Acacia nilotica* leaf meal inclusion levels of 10, 15, 20 or 30% of the total diet. The goats were fed ad libitum, allowing a 15% refusal of each diet. The experimental lasted for 21 days. Feed intake was measured throughout the study period. Methane emissions were measured using a hand-held CH4 detector. Methane produced was then read as parts per million-metre (ppm-m). The effects of *Acacia nilotica* leaf meal inclusion levels were subjected to analysis of covariance. Where the covariates showed no significant effect, the data was analyzed with analysis of variance at 5% level of probability with diet as a fixed factor.

Findings: *Acacia nilotica* leaf meal improved diet crude protein. Additionally, inclusion of *Acacia nilotica* leaf meal reduced CH4 emission in Boer bucks.

Conclusion & Significance: *Acacia nilotica* leaf meal had positive impact on animal productivity and enteric methane emissions. Thus, *Acacia nilotica* leaves have a potential of being a protein feed for ruminants.

Recent Publications

1. Brown D et al. (2016) Blood profiles of indigenous Pedi goats fed varying levels of Vachellia karroo leaf meal in *Setaria verticillata* hay-based diet. South African Journal of Animal Science. 46(4):432-440. Doi:10.4314/sajas.v46i4.11.

2. Brown D and Jones W Ng'ambi (2017) Effect of polyethylene glycol 4000 supplementations on the performance of yearling male Pedi goats fed dietary mixture levels of *Acacia karroo* leaf meal and *Setaria verticillata* grass hay. Tropical Animal Health and Production. 49(5):1051-1057. Doi:10.1007/s11250-017-1305-9.

3. Brown D, Ngambi J W and Norris D (2017) Effect of Acacia karroo leaf meal inclusion on feed intake, digestibility and live weight gain of pedi goats fed a Setaria verticillata grass hay-based diet. Journal of Applied Animal Research. 46(1):248-253. Doi:10.1080/09712119.2017.1289939.

4. Ng'ambi J W et al. (2018) Effects of mixture level of sorghum hay with forage legumes on performance and blood metabolites of yearling indigenous pedi bucks. Applied Ecology and Environmental Research. 16(3):2197-2212. Doi:10.15666/aeer/1603_21972212.

Biography

David A Brown is presently a Postdoctoral Fellow in the Department of Animal Production, University of Limpopo, Republic of South Africa. His expertise lies is in ruminant nutrition. His current research interest includes: i) browsing plant utilization in ruminant. ii) feeding strategies to increase ruminant and non-ruminant production. iii) mitigation of greenhouse gases in ruminants utilizing plant bio-active compounds. He has presented his research findings at several international conferences including Canada, Germany, Ireland, USA and UK.

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