

In Situ dry matter and nitrogen degradability of ammonium nitrate and urea treated dry veld grass and Zea mays stover in mature goats

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Abstract

An in situ degradability study, in a factorial randomised complete block design, was carried out using three rumen-cannulated Kapaters (mature male castrate goats) to investigate the effects of ammonium nitrate treatment on poor quality roughages. The study was carried out in two phases: phase 1 had dry veld grass subjected to ammonium nitrate and urea treatment and phase 2 had maize stover similarly treated. Phase 1 treatments were: untreated dry veld grass only (DVG, control), urea treated dry veld grass (UDVG) and ammonium nitrate treated dry veld grass (ANDVG). Phase 2 treatments were made up of untreated maize stover (MS, control), urea treated maize stover (UMS) and ammonium nitrate treated maize stover (ANMS).

Results indicated that treatment of dry veld grass with both ammonium nitrate and urea significantly ($P < 0.05$) increased DM loss of the dry veld grass while the same treatment had no significant effect on DM loss of maize stover. ANDVG recorded 18.05 % actual DM loss which was significantly higher than that recorded for DVG and UDVG that had statistically similar (11.56 % and 15.42 % respectively) actual DM losses in the first 12 hours of incubation. In phase 2 of the trial all treatments recorded statistically similar actual DM losses that averaged 22.70 % during the first 12 hours of incubation. In both experimental phases length of incubation time had a significant effect ($P < 0.001$) on DM loss with most of the DM loss occurring within the 12- to 24-hour incubation time bracket. Results also showed that in all trial phases both treatment and length of incubation time significantly ($P < 0.001$) increased the actual N disappearance. ANDVG and ANMS (ammonium nitrated treated roughages) had the highest percentages of nitrogen disappearance, with 1.638 % and 1.1780 % respectively, whilst DVG and MS (raw roughages) had mean N-disappearance values of 0.1557 % and 0.308 respectively (the lowest) in 12 hours of incubation. In both phases of the trial most of the N was lost within the 12- to 24-hour incubation time.

Roughage treatment with ammonium nitrate increased effective degradability of DM and N across different ruminal fractional outflow rates. The study showed that ammonium nitrate could also be used in enhancing the in situ degradability of poor quality roughages particularly dry veld grass.