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Investigation of Influence of Maize Stover Components and Urea Treatment on Dry Matter Digestibility and Fermentation Kinetics Using in vitro Gas Techniques

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Abstract : Improving nutritive values and digestibility of maize stover is an alternative way to increase their utilization in ruminant and reduce air pollution from open burning of maize stover in the northern Thailand. The present study, 2x3 factorial arrangements in completely randomized design was conducted to investigate the effect of maize stover components (whole and upper stover; cut above 5th node). Urea treatment at levels 0, 3, and 6% DM on dry matter digestibility and fermentation kinetics of maize stover using in vitro gas production. After 21 days of urea treatment, results illustrated that there was no interaction between maize stover components and urea treatment on 48h in vitro dry matter digestibility (IVDMD). IVDMD was unaffected by maize stover components ($P > 0.05$), average IVDMD was 55%. However, using whole maize stover gave higher cumulative gas and gas kinetic parameters than those of upper stover ($P<0.05$). Treating maize stover by ensiling with urea resulted in a significant linear increase in IVDMD ($P<0.05$). IVDMD increased from 42.6% to 53.9% when increased urea concentration from 0 to 3% and maximum IVDMD (65.1%) was observed when maize stover was ensiled with 6% urea. Maize stover treated with urea at levels of 0, 3, and 6% linearly increased cumulative gas production at 96h (31.1 vs 50.5 and 59.1 ml, respectively) and all gas kinetic parameters excepted the gas production from the immediately soluble fraction ($P<0.50$). The results indicate that maize stover treated with 6% urea enhance in vitro dry matter digestibility and fermentation kinetics. This study provides a practical approach to increasing utilization of maize stover in feeding ruminant animals.

Keywords : maize stover, urea treatment, ruminant feed, gas production
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