ALKALI TREATMENT OF MAIZE COBS AND MAIZE STOVER TO IMPROVE THEIR NUTRITIVE VALUE

BY

SILVANO KIPRAISI TUBEI

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1. SUMMARY

The study consisted of two experiments:

i) The evaluation of the nutritive value of anhydrous ammonia treated maize cobs (MC) and maize stover (MS) by feeding to sheep.

ii) The effect of moisture level, length of treatment, time, and the level of anhydrous ammonia on the nitrogen content, the in vitro digestibility of dry matter and organic matter and on the cell constituent contents.

In the first experiment ammonia treated MC (at 3.5% NH_3) and ammonia treated (MS) at 4.0% NH_3 was compared with untreated MC and MS. Fourty (40) intact male weaner Dorper sheep of fairly uniform size, 6-8 months of age were randomly assigned to four treatments; namely Untreated MC, NH_3-treated MC, Untreated MS and NH_3-treated MS. Along with the roughages which were offered ad libitum, 400 g of concentrate supplement (approximately at maintenance requirement) was fed to each sheep per day

The in vivo digestibility of the untreated MC, NH_3-treated MC, Untreated MS, NH_3-treated MS was determined with 3 Dorper wethers per ration. 500 gm of the four roughages plus 100 g of Soya bean meal were offered to animals daily in two portions. Data of the average daily gains (ADG), intake of DM and OM and in vivo digestibility were subjected to a one-way analysis of variance.

In the second experiment the MC and MS were ammoniated at 0, 2.5 and 4.0% level of ammonia (DM basis). For each level of ammonia treatment moisture level was at 20 and 40% and treatment times were 4 and 8 weeks. A factorial design 3 x 2 x 2 x 2 was adopted to test the effect of three levels of ammonia two parallels on the nitrogen content and in vitro digestibility of MC and MS.

Average daily gains (ADG) for sheep fed untreated MC, NH_3-treated MC, untreated MS and NH_3-treated MS were 79.4, 129.9, 61.8 and 88.7 g respectively. These differences in ADG were significant at ($P < 0.01$). Daily dry matter and organic matter intake of untreated MC and NH_3-treated MC, untreated MS and NH_3-treated MS per animal were 359, 329; 634, 558; 388, 320 and 434, 414 g respectively. DM and Om intake g/kg per metabolic body weight were 25.28,, 23.18; 41.52m 39.37, 23.57, 22.35 and 28.38, 27.03 for untreated MC, NH_3-treated MC, NH_3-treated MC, untreated MS and NH_3-treated MS respectively. There was a statistically significant ($P< 0.01$) difference in the DM and OM intake between the treatments described above.

In vivo digestibility of both MC and MS increased by 6.2 and 2.8 on ammonia treatment. This increase was however not significant.

Significant ($P< 0.01$) effect on level of NH_3 on the nitrogen content of MC and MS was observed. Following ammoniation the N-content increased in the range of 1.5-2.2 N in percent units for MC and

0.89-1.6% N for MS on dry matter basis. However, the nitrogen content decreased by about 15% for MC and 21.5% for MS after 7 days exposure. Significant ($P< 0.05$) interaction between moisture level and the level of anhydrous ammonia to influence the N- content of MS was observed.

Average IVDMD and IVOMD for MC for all levels of moisture and treatment time were 48.3, 59.3, 61.7 and 51.1, 58.3, 61.3 for 0, 2.5 and 4.0% levels of ammonia respectively. The effect of both moisture content and treatment time on the IVDMD of MC was not significant. A significant increase in the IVDMD and IVOMD of MS when the level of ammonia increased from 0, 2.5 to 4.0% and IVDMD and IVOMD values for MS were 51.2, 65.6, 70.6 and 48.9, 65.3, 72.6 respectively for 0, 2.5 and 4.0% NH_3.

There was a general slight decline in the percent NDF in the ammonia treated MC and MS, although the decline was variable for ammoniated MS. The percent ADF remained unchanged for MC but reduced slightly for MS. Lignin content of MC and MS was relatively unchanged on ammonia treatment.