Ensiling characteristics and nutritive value of browse/maize forage mixtures

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Introduction The practice of growing fodder tree and shrubs is being advocated for and adopted in smallholder dairy production systems. In Uganda, *Calliandra calothyrsus*, *Gliricidia sepium*, and *Leucaena leucocephala* have been identified and recommended as the most suitable species (Sabiiti, 2001). However tree foliage contains toxic compounds (Lowry, 1990), which may be alleviated by ensiling. The objective of the experiment was to study the ensiling characteristics of browse/ maize forage mixtures and their nutritive value when fed to lactating dairy cows.

Materials and methods Calliandra, Gliricidia and Leucaena tree foliages were ensiled with maize forage in a ratio of 1: 5 (dry matter (DM) basis). Silage was also made from maize forage alone. The silages were fed to Friesian dairy cows in mid-lactation in a 4x4 Latin square design with 28-d periods to determine DM intake, milk yield and composition. In addition, cows were supplemented with 4 kg/d of a commercial dairy meal.

Results All silages fermented well, but lactic acid content was higher ($P<0.05$) for maize silage compared to the browse/maize silages. Dry matter losses were higher ($P<0.05$) for the maize silage. Silage DM and total DM consumption were higher ($P<0.05$) for Calliandra and Gliricidia silages compared to Leucaena or maize silages. Milk yield followed the same trend. While milk fat was similar among treatments, milk protein was higher ($P<0.05$) for the maize silage compare to the other silages.

Table 1 Fermentation characteristics (% DM) of the silages

Silages	Calliandra	Gliricidia	Leucaena	Maize	s.e.m.
DM %	31.8^{a}	28.5^{b}	26.1^{b}	23.3^{bc}	1.0
CP %	16.7^{a}	10.7^{b}	11.9^{b}	11.7^{b}	1.1
Acetic acid	2.11	1.95	2.16	2.16	0.13
Butyric acid	0.12^{b}	0.79^{a}	0.65^{a}	0.29^{b}	0.09
Lactic acid	4.75^{b}	3.26^{c}	3.73^{bc}	6.20^{a}	0.40
pH	4.33	4.18	3.81	3.67	0.29
NH_3-N (% total N)	5.49	5.97	6.24	5.73	0.28
DM losses %	5.01^{b}	0.28^{c}	7.41^{b}	13.50^{a}	1.83

Table 2 Dry matter intake, milk yield and composition for cows fed the four silages

Silages	Calliandra	Gliricidia	Leucaena	Maize	s.e.m.
DMI (kg/d)					
Silage	10.50^{a}	9.68^{ab}	9.04^{b}	9.23^{b}	0.40
Total	14.16^{a}	13.34^{ab}	12.70^{b}	12.89^{b}	0.40
$g/kgW^{3/4}$	163.33^{a}	154.74^{ab}	145.85^{b}	148.61^{b}	3.65
Milk yield (kg/d)	9.72^{a}	9.86^{a}	9.46^{b}	9.04^{c}	0.07
BF %	3.86	3.81	3.81	3.81	0.04
4% FCM (kg/d)	9.56^{a}	9.57^{a}	9.19^{b}	8.78^{c}	0.09
Protein %	2.62^{b}	2.65^{ab}	2.62^{b}	2.69^{a}	0.02

Conclusion Inclusion of the browses did not affect silage fermentation. Silages made from a mixture of browse and maize resulted in higher DM intakes and milk yields of dairy cows than with silage made from maize alone.

References

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