

The effects of replacing maize silage by triticale whole crop silage in a roughage mixture with grass silage on feed intake and milk production by dairy cows

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Introduction In the Netherlands, grass and forage maize are the most important fodder crops. However, on drought prone sandy soils, and in years with insufficient rainfall the yield of maize is very low (7 to 8 tons DM/ha). Therefore, sprinkle irrigation is often applied to overcome problems with drought. However, in some regions sprinkle irrigation is not possible because of a lack of suitable water or due to legislative restrictions on the use of water for irrigation. In situations where water is a limiting factor for growing maize, triticale may be an alternative fodder crop. Triticale grows mainly during the early spring when there usually is a precipitation surplus and so, water is not a limiting factor for growth. When triticale is harvested as triticale whole crop silage the DM yield ranges between 9 and 11 ton of dry matter per hectare. Therefore, under water limiting conditions it may be attractive to replace forage maize by triticale whole crop silage. The objective of this study is to obtain information about the effects of replacing maize silage by triticale whole crop silage on feed intake and milk production by dairy cows

Materials and methods Two similar feeding trials were conducted in the winter season of 1996/1997 and 1997/1998 respectively. In both trials the treatments M and T were compared. The cows on treatment M received *ad libitum* a roughage mixture consisting of maize silage and grass silage in a ratio of 1:1 on a dry matter basis. For the cows on treatment T, the maize silage in the roughage mixture was replaced on a dry matter basis by triticale whole crop silage. In the 1996/1997 trial, the level of concentrate supplementation was 10 kg and 12 kg for heifers and multiparous cows, respectively. For the 1997/1998 trial the level of concentrate supplementation was 9 kg and 11 kg for heifers and multiparous cows, respectively. Rations were formulated to meet the requirements for DVE (true protein digested in the small intestine). Cows were housed in a cubicle shed.

In both feeding trials, 26 cows of which 10 heifers were used. The experiments were performed according to a completely randomised block design. The cows were grouped in blocks according to variation in parity and milk production in the previous lactation (cows) or pedigree index (heifers). Within one block the cows were allocated to treatment M and T. The experimental period started for each cow after calving and lasted for 15 weeks. During the experimental period individual feed intake was measured daily. The milk weights were recorded twice daily at each milking and milk samples for milk composition were taken on four consecutive milkings each week. Milk of the combined morning milkings was analysed separate from the milk of the combined afternoon milkings. The data on feed intake and milk production were analysed by analysis of variance. Treatment means were compared using Students' t-test.

Results The effects on feed intake are presented in Table 1. There was no significant difference in either roughage intake or total dry matter intake. However, intake of net energy for lactation NEL was significantly ($P < 0.05$) lower on treatment T. The effects on milk production are given in Table 2. In both trials there was no significant difference in milk yield and milk composition.

Table 1 Average daily intake of DM and NEL

Intake	T	M	SED	Sig
Roughage (kg DM)	10.7	10.4	0.5	NS
Total DM (kg)	20.3	20.0	0.5	NS
NEL (MJ)	126	133	2.8	*

NS No significant difference

* Significant difference (P-value between 0.01 and 0.05)

Table 2 Average daily milk production and milk composition

Production	T	M	SED	Sig
Milk yield (kg)	31.2	30.8	1.1	NS
Fat (g/kg)	46.4	46.8	1.5	NS
Protein (g/kg)	33.1	33.7	0.6	NS

NS No significant difference

Conclusion This study demonstrated that there is no significant difference in either feed intake or lactational performance between triticale whole crop silage and maize silage. However, calculated the intake of net energy for lactation was lower at the triticale based ration. It can be concluded that the net energy value for lactation is underestimated for triticale whole crop silage.