Effect on milk production when maize silage from two hybrids harvested at two stages of maturity is partly substituted with grass silage

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INTRODUCTION

Land use in Denmark for growing maize for silage has increased from 4% of cultivated forage area in 1990 to 30% in 2004. The proportion of the forage area used for fodder beets has decreased from 21% to 2% in the same time span. Maize silage is therefore one of the most important forages used in Danish milk production today.

MATERIALS AND METHODS

- 64 Danish Holstein cows, half in first lactation
- 2+12 week standard and experimental periods
- 8 treatments in a 2x2x2 factorial design
  - 2 maize hybrids (low (Pretti) or high (Bangay) NDF digestibility)
  - 2 maturities (early harvest 30% DM and late 36% DM)
  - ± substitution of 1/3 maize silage with grass-clover sil.
- TMR with forage:concentrate DM ratio 60%:40%
- Individual feed intake
- Production (milk yield, weight gain)
- Chewing time
- Digestibility production level (INDF internal marker)

CONCLUSIONS

Maize hybrid with high digestible compared to low digestible NDF (especially when maize silage makes up all forage):

- Increased DM intake
- Increased milk yield
- Reduced chewing time

More mature maize silage (36-37 vs. 30 % DM):

- Increased DM intake
- Did not affect milk yield
- Reduced chewing time

Substitution of 1/3 of maize silage with grass-clover silage:

- Increased feed intake (not for late - high NDF digestible)
- Increased milk yield

Most effects could be explained by potential ration NDF digestibility. Increased maturity of maize silage increased feed intake but milk yield did not respond correspondingly. A high milk yield can be sustained with good (high digestible) maize silage as the only forage.

Results

In the figures main results are shown. Rations with low NDF digestible hybrids are indicated with □, high digestible with △, late harvest symbols are filled out, substitution of maize silage with grass-clover silage is indicated with green, pure maize forage with red. Response is plotted either against dry matter intake, net energy intake or ration potential NDF digestibility. Ration potential NDF digestibility was based on digestibility measured in sheep fed at maintenance level.

Forage characteristics

	Maize silage				
	Low NDF dig. Early	High NDF dig. Early	Low NDF dig. Late	High NDF dig. Late	Grass-clover silage
Dry matter %	30	30	38	36	48
Ash (% DM)	4	4	4	4	11
Crude protein (% DM)	8	8	8	8	21
NDF (% DM)	46	42	46	38	36
Starch (% DM)	18	25	26	31	1
In vivo sheep OM digestibility	0.71	0.76	0.69	0.78	0.81
In vivo sheep NDF digestibility	0.58	0.64	0.54	0.64	0.82