

High fibre concentrates for Jersey cows grazing kikuyu/ryegrass

R. Meeske, P.C. Cronje & G.D. van der Merwe

Department of Agriculture Western Cape, Outeniqua Research Farm George, 6530, Republic of South Africa



Introduction



Grazed forage is the
cheapest nutrient source

Concentrates are 3 X
more expensive than
pasture

Leads to lower cost
feeding systems for dairy
COWS

Introduction

Pasture basis for profitable milk
production

Concentrate: maize grain high starch

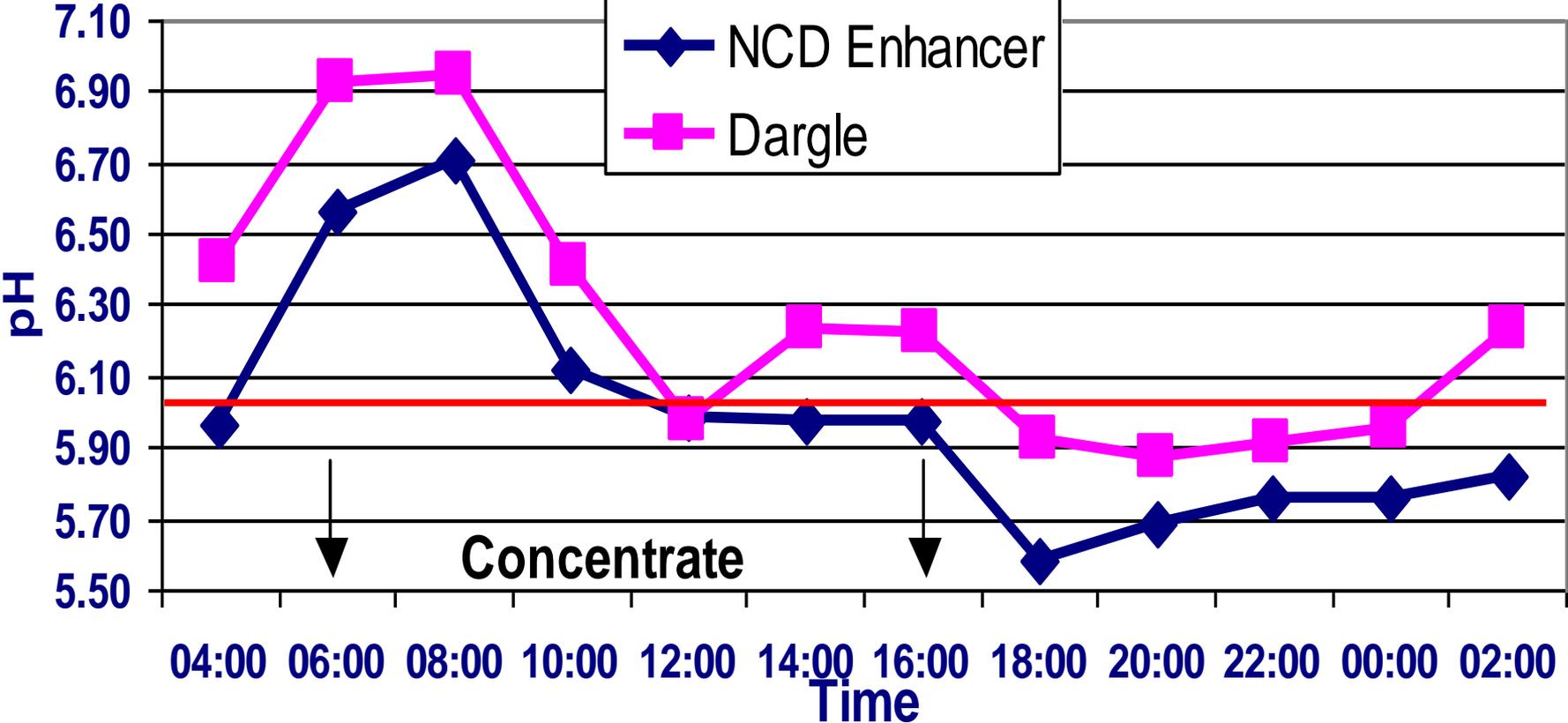
Protein sources expensive

By-products:

Hominy chop, Gluten 20, wheat bran

Lower energy content/ lower starch
more digestible fibre

Figure 1. The pH in the rumen of cows (n=2) fed 3.6kg DM of 12% CP dairy concentrate grazing on NCD Enhancer or Dargle (SEM=0.05)



Aim of the study:

To determine the effect of replacing maize and soybean oilcake with hemicellulose rich by-products in concentrates fed to Jersey cows grazing high quality ryegrass

Focus on Starch: hemicellulose ratio

Methods (1)

45 Jersey cows were divided in 15 blocks of 3 comparable cows/block

Cows within blocks were randomly allocated to treatments (15 cows/treatment)

Cows were fed 6kg of dairy concentrate/day (3kg at each of 2 milkings)

Methods (2)

Milk production was recorded daily and milk composition every 14 days

Cows grazed as one group on annual ryegrass (cv Energa at 20kg/ha over-sown into kikuyu during March 2008) with a 28 day grazing cycle from September to October.

Pasture was fertilized with 56kg N (LAN) after each grazing.

Methods (3)

Cows were weighed and condition scored (1-5 scale) on two consecutive days at the start and end of the experimental period.

The experimental period consisted of an adaptation period of 10 days and a measurement period of 40 days (Sept to October).

Table 1. Ingredients of dairy concentrates with different levels of by-products

Ingredient	High maize	Med maize	Low maize
Maize	80.4	40.7	20.7
Hominy chop	0	25	35
Wheat bran	0	11	18
Gluten 20	0	11	18
Soybean oilcake	11	4	0
Molasses	4	4	4
Feedlime	2	2.2	2.2
MCP	0.5	0	0
Salt	1	1	1
Sodium bicarb	0.5	0.5	0.5
MgO	0.3	0.3	0.3
Premix	0.33	0.33	0.33

Table 2a. Nutrient composition of different concentrates (% of DM)

Nutrient	High maize	Med maize	Low maize
DM (%)	89.1	88.9	88.7
CP (%)	13.0	13.0	13.0
RUP (% of CP)	60	54	50
ME (MJ/kg)	12.7	11.6	11.0
NDF (%)	11.1	21.9	27.8
ADF (%)	5.08	8.16	9.84

Table 2b. Nutrient composition of different concentrates (% of DM)

Nutrient	High maize	Med maize	Low maize
Hemicellulose (%)	6.0	13.8	18.0
NFC (%)	64	52	45
Starch (%)	57	44	36
Starch: Hemicellulose	9.5 : 1	3.2 : 1	2 : 1
Fat (%)	4.5	6.0	6.5
Ca (%)	0.98	0.94	0.94
P (%)	0.43	0.5	0.6

Results



Table 3. Milk production and milk composition of cows grazing annual ryegrass pasture supplemented with 6kg of concentrate with different levels of maize grain (n=15)

Parameter	High Maize	Medium maize	Low Maize	LSD
Milk production (kg/day)	21.0	20.8	20.1	1.31
FCM (kg/day)	19.9 ^b	20.7 ^{ab}	21.3 ^a	1.37
Milk fat %	3.66 ^b	4.03 ^{ab}	4.41 ^a	0.451
Milk protein %	3.45	3.55	3.42	0.168
MUN mg/dl	17.8	17.8	18.1	1.22

Table 3. Live weight (LW) and condition score (CS) of cows grazing annual ryegrass pasture supplemented with 6kg of concentrate containing different levels of maize grain (n=15)

Parameter	High Maize	Medium maize	Low Maize	LSD
LW at start (kg)	385 ^a	354 ^b	358 ^b	27.3
LW at end (kg)	409	382	385	28.5
LW change (kg)	24	28	27	9.16
CS start (1-5)	2.38 ^a	2.27 ^{ab}	2.17 ^b	0.190
CS end (1-5)	2.40	2.27	2.23	0.207
CS change	0.02	0.00	0.06	0.142

Conclusions

- It is concluded that lowering the starch:hemicellulose ratio of a dairy concentrate by replacing 75% of maize grain with hominy chop, wheat bran and gluten 20 increased 4% fat corrected milk production and milk fat content.
- Including high fibre feeds like hominy chop, wheat bran and gluten 20 in dairy concentrates for cows grazing high quality ryegrass pasture seems promising.

Thank you !!

