Effect of two levels of ground wheat as concentrate replacer on the performance of lactating Holstein cows

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Situation

- Previous research:

  First 2 trials
  - Good results with 4.6 kg upto 6.1 kg DM of 2 different forms (rolled, NaOH treated) of wheat in a MS/PGS diet without indications of acidosis
  - However, no control diet without wheat

Situation

- Third trial:
  - Diet MS/PGS a.l. + 3 kg DM sugarbeet pulp
  - Replacing part of conc and soybean meal by 3.5 kg DM wheat or CCM, decreased roughage and total DM intake and milk yield vs control diet (no wheat).
- Question: is 3.5 kg DM to much?

Materials and methods

- Latin square design 3 x 3 (1 period = 4 weeks, last 2 weeks collection milk samples (4/week))
- 18 Holstein cows
- 140 days in lactation, 30 liters milk at start
- roughage diet: 60%/40% maize silage / prew. grass silage + 10 kg pressed sugarbeet pulp
- supplemented with soybean meal, concentrate, urea
- all diets formulated : similar energy (NEL) and protein supply (CP, DPI, RDPB)

Materials and methods

- Treatments: 0, 2 or 4 kg wheat
  - Period 1: 0, 2.2 and 4.4 kg wheat
  - Period 2: 0, 2.0 and 4.0 kg wheat
  - Period 3: 0, 1.8 and 3.6 kg wheat
- Concentrate: -0.3 and -0.15 kg weekly for multi- and primiparous cows (lactation stage)
- In several cases, to few concentrate to be replaced => part of the wheat was fed as surplus

Results: diet composition

(g/kg DM)	Control	2 kg wheat	4 kg wheat
CP	142	145	147
EE	30	29	28
CF	202	187	172
ash	89	84	77
NDF	394	370	346
starch	139	181	224

Results: DM intake

(kg)	Control	2 kg wheat	4 kg wheat
maize silage	8. 6[a]	7.8[ab]	7.1[b]
pr grass silage	6.1[a]	5.6[ab]	5.0[b]
pr. beet pulp	2.0	2.0	2.0
rolled wheat	0.0	1.7	3.4
concentrates	2.0	1.4	1.0
totaal	18.7	18.5	18.5

a,b: significant differences for Scheffé test at P =0.05

Results: nutrient intake

	Control	2 kg wheat	4 kg wheat
NEL (MJ/d)	122.5	123.5	126.2
NEL (% of needs)	105	105	105
DPI (kg/d)	1,39	1,41	1,43
DPI (% of needs)	105	106	105
RDPB (g/d)	238	271	279

no significant differences at p=0.05

Results: performance

	Control	2 kg wheat	4 kg wheat
milk production (kg)	24.2	24.4	24.5
fat content (%)	4.73	4.57	4.94*
protein content (%)	3.23	3.22	3.32
FPCM (kg)	25.9	25.7	27.1
weight gain (kg/d)	-0.26	-0.27	-0.04

no significant differences at p=0.05

* p=0.08 (Scheffé) diff from 4.57

Conclusion

- Replacing concentrates with wheat resulted in a reduction of the DM-intake
- All treatments had similar levels of energy and protein supply
- No significant influence of wheat level was found on milk production or on milk fat and protein content, but a tendency to have an increased milk fat content with 4 kg wheat.