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Milk Response Rates From Concentrates In Early Lactation At Different Post Grazing Residuals

Harkin Agricultural Consultants Ltd

Conal Harkin MAgrSc

Research Trial Lincoln University

Conal Harkin Masters Thesis

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32 mixed parity friesian x jersey dairy cows were allocated to one of 4 treatments

(1) Low Residual - 3.5 cm or 1,480 kg DM/ha (7 clicks)

(2) Low Residual **Plus 4 kg Grain Supplement**

(3) High Residual - 4.5 cm or 1,760 kg DM/ha (9 clicks)

(4) High Residual **Plus 4 kg Grain Supplement**

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- Cows blocked for trial based on the following
  - Age - 4.8 ± 0.2 years
  - DIM - 15 ± 2 days
  - LW - 427 ± 13 kg
  - BW - 121.5 ± 7.5 BW
  - Previous MS production - 389 ± 7 kg MS/cow/year

- Stocking Rate
  - 4.4 cows/ha – Non-supplemented herds
  - 4.9 cows/ha – Supplemented herds

- Supplement
  - 4 kg grain based concentrate (13.7 MJ ME/kg DM, 16% CP)

- Duration
  - 90 days (Post colostrum period)

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- Average short term milk response
  - 140 g MS/kg DM concentrate
    - High residual
      - 160 g MS/kg DM concentrate
    - Low residual
      - 120 g MS/kg DM concentrate

- Dry Matter Intake

	Rotation	LR	LR+	HR	HR+
Pasture DMI kg	1	15.0	13.3	15.2	14.1
	2	15.2	13.2	15.5	13.4
	3	15.1	12.3	14.7	13.2
Total DMI kg	1	15.0	15.3	15.2	16.1
	2	15.2	15.8	15.5	16.6
	3	15.1	15.9	14.7	16.8

- Forage DMI was significantly lower for supplemented than unsupplemented groups throughout all three rotations
- Concentrate supplementation significantly increased total DMI throughout all 3 rotations

Theory & Other Research

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- Theoretically 76 MJ ME required to synthesize 1 kg MS
- Therefore1 MJ ME of supplement should produce 13 g MS (1 kg or 1,000 grams divided by 76 MJ ME = 13)
- Therefore 12 MJ ME could produce maximum response of 156 g MS (12*13) if all the energy was partitioned to milk production
    - Lincoln Trial Concentrate -13.73 MJ ME = 178.5 g MS/kg DM Maximum Response – Average Response was 140 g MS/kg DM
- Response rates in other research range from 80 – 100 g M/kg DM across various supplement types

Long Term Response Rates
Commercial Farm Data

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Real Farm - Gore Area	1819	1920	2021	2122	2223	2324	2425B
Herd Size	425	430	400	400	400	400	400
Hectares	160	160	160	160	160	160	160
Hectares - Pasture	152	152	152	152	152	152	152
Hectares - FB	8	8	8	8	8	8	8
Production - Total kg MS	158,376	175,330	167,509	174,538	198,548	208,155	200,000
Production - kg MS/cow/year	373	408	419	436	496	520	500
Production - kg MS/ha/year	990	1,096	1,047	1,091	1,241	1,301	1,250
Total Supplement Per Cow (t DM)	0.80	1.29	1.36	1.63	1.56	1.99	2.17
Additonal Supplement Per Cow (t DM)		0.49	0.56	0.82	0.76	1.19	1.36
Average Cost Supplement Per Tonne	**$ 450**						
Total Additional Supplement (t DM)		210	224	330	304	474	546
Cost of Additional Supplement		$ 94,622	$ 100,800	$ 148,320	$ 136,800	$ 213,480	$ 245,520
Additional Milk Produced (kg MS)		16,954	9,133	16,162	40,172	49,779	41,624
Milk Price - Actual	**$ 6.35**	**$ 7.14**	**$ 7.54**	**$ 9.30**	**$ 8.22**	**$ 7.83**	**$ 10.00**
Value of Additional Milk - Actual		$ 121,052	$ 68,863	$ 150,307	$ 330,214	$ 389,770	$ 416,240
MOFC - Actual		$ 26,430	-$ 31,937	$ 1,987	$ 193,414	$ 176,290	$ 170,720
Milk Price - Variable	**$ 9.00**						
Value of Additional Milk - Variable		$ 152,586	$ 82,197	$ 145,458	$ 361,548	$ 448,011	$ 374,616
MOFC - Variable		$ 57,965	-$ 18,603	-$ 2,862	$ 224,748	$ 234,531	$ 129,096
Milk Response (g MS/kg DM)		81	41	49	132	105	76
6 Week In Calf Rate (%) - FFR	68	69	67	76	78	81	81
Not In Calf Rate (%) - FFR	24	17	20	11	13	12	8
SCC	261	224	184	160	146	162	162

Conclusions

- Concentrate supplementation was shown to increase MS production in this trial
- Milk response from concentrate supplements can vary depending on post grazing residual level
- The long term response is likely to be greater than the short term response
  - ⟶ BCS Gain