

RAPSEED MEAL AS A PROTEIN SUPPLEMENT FOR DAIRY COWS

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The effect of long term feeding of Swedish commercial rapeseed meal (RSM*) was studied in two experiments with individually fed cows (Lindell, L. & Knutsson, P-G., 1976, Lindell, L. 1976). Each experiment covered two lactations. The first ten weeks after calving in the first experimental lactation were used as a preperiod and the experimental period started 11 weeks after calving and continued to 40 weeks after calving in the second experimental lactation. The experimental design was the same in the two experiments.

In the first experiments, with 30 cows of the Swedish Friesian breed (SLB), three different concentrates containing 0 % (group 1), 4.2 % (group 2) or 8.05 % (group 3) of RSM were fed according to milk production. The maintenance ration consisted of 5 kg of hay and 2.5 kg dry matter of beet tops silage.

In the second experiment, with 22 SLB cows, two different concentrates containing 0 % (group 1) and 10 % (group 2) of RSM were fed according to milk production. The maintenance ration in this experiment consisted of 3.5 kg hay, 2.0 kg straw and 2.0 kg dry matter of grass silage.

The calculation of requirements for metabolizable energy (ME) and digestible crude protein was based on the current Swedish standard, i.e. 0.507 MJ ME per kg body weight exp. 0.75 and 6 g digestible crude protein per MJ ME for maintenance and 5.0 MJ ME and 60 g digestible crude protein per kg of 4 % fat corrected milk (FCM).

The amount of concentrates was adjusted weekly according to the milk yield of the previous week. All cows were kept tied up and handled individually with feeding and milking twice a day.

RESULTS

Feed consumption

There was no difference in consumption of offered feeds between the groups and feed refusals were small. No palatability problems connected with feeding of RSM were observed during any part of the lactations. The change from the concentrate fed during the preperiods to those fed during the experimental periods could be made without any adaption problems.

* Manufactured by the Swedish Oil Extraction Ltd., Karlshamn, Sweden

TABLE 1.
AVERAGE DAILY CONSUMPTION OF CONCENTRATES, KG

	<u>Experiment 1</u>			<u>Experiment 2</u>	
	<u>Group</u>			<u>Group</u>	
	<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>
Lactation 1 weeks 11-40	6.38	6.48	6.40	7.17	6.97
Lactation 2 weeks 2-40	7.18	7.64	7.60	7.80	7.80

The consumption of concentrates during the second lactation represented an average daily intake of 0.32 kg and 0.61 kg RSM in group 2 and 3 in experiment 1 and 0.78 kg RSM in group 2 in experiment 2. The highest consumption of RSM in experiment 2 was 1.39 kg per day measured as an average over seven days.

The content of isothiocyanates was 4.1 mg (S.D. 0.4) and of oxazolindine-thiones 9.7 mg (S.D. 1.5) per g dry matter of RSM fed in experiment 1. Traces of myrosinase were found in 3 of 27 samples.

The content of isothiocyanates in RSM fed in experiment 2 was 4.3 mg (S.D. 0.5) and of oxasolidinethiones 9.5 mg (S.D. 1.5) per g dry matter. Traces of myrosinase were found in 3 of 29 samples in this experiment.

Milk yield

The differences between the groups in milk yield and fat per cent of the milk during the first lactation in experiment 1 were small. The differences were greater during the second lactation in this experiment. The milk yield and fat per cent of the milk were almost equal in the two groups in experiment 2. The average yield for the groups cannot, however, be directly compared during the second lactation depending on cows taken out of the experiment after the first experimental lactation of both experiments.

The differences in milk yield and chemical composition of the milk between the groups were not significant when the yield during the experimental periods was corrected for differences in yield between the groups during the preperiod (analysis of covariance).

TABLE 2.
AVERAGE MILK YIELD AND FAT CONTENT OF THE MILK

	<u>Experiment 1</u>			<u>Experiment 2</u>	
	<u>Group</u>			<u>Group</u>	
	<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>
<u>Lactation 1 weeks 11-40</u>					
Milk, kg	14.50	14.81	14.51	15.97	15.41
FCM, kg	14.36	14.53	14.33	15.78	15.11
Fat, %	3,92	3,85	3,97	3,92	3,89
<u>Lactation 2 weeks 2-40</u>					
Milk, kg	16.90	18.66	17.97	17.71	17.69
FCM, kg	16.48	17.88	17.68	17.23	17.14
Fat, %	3.82	3.71	3.90	3.80	3.80

HEALTH OF THE COWS

A control of the general health of the cows including the determination of a number of blood components as well as the total iodine and thiocyanate levels in the milk, was carried out by the Department of Clinical Biochemistry of the Royal Veterinary College of Sweden¹⁾. The general condition of the cows was normal for the herd. A few cows were taken out of the experiments after the first experimental lactation due to causes not associated with the feeding of RSM. The values obtained in hematological and chemical analyses of blood were within the normal range. Cows fed RSM had on the average higher thiocyanate and lower total iodine concentration in their milk than cows fed no RSM. It was also found that all groups showed an increasing total iodine concentration in milk during the lactation.

In experiment 2 a mineral supplement containing potassium iodine was fed, which led to a general increase in milk iodine concentration as compared with experiment 1 where no extra iodine was fed.

Average calving intervals and services per conception were normal and no significant differences between the groups were observed. However, cows with the highest level of RSM did show a slightly but not significantly greater number of services per conception during the second lactation in both experiments.

DISCUSSION

The present investigations do not indicate any differences in palatability between a concentrate mixture containing 10 % RSM and a concentrate where RSM was replaced by soybean meal, although an average quantity of 1.13 kg RSM was fed during one week of peak lactation. Neither milk production nor milk composition seemed to be negatively affected by this level of RSM. The total milk yield of individual cows during the second lactation in experiment 2 (weeks 2-40) ranged from ca 3800 kg to 5900 kg FCM. High yielding cows did not react differently from low yielding ones, nor could any difference in persistency of milk production be discovered between the two groups when comparing the slope of the lactation curves.

The results from these two experiments indicate that concentrates containing up to 10 % Swedish commercial RSM can be fed to dairy cows over long periods without adverse effects on milk production and composition. The material is too small, however, to permit any conclusions about possible effects of RSM on fertility.

REFERENCES

- Lindell, L. & P.-G.Knutsson, 1976. Rapeseed meal in rations for dairy cows, 1. Swedish J. Agric. Res. 6, 55-63.
- Lindell, L., 1976. Rapeseed meal in rations for dairy cows, 2. Swedish J. Agric. Res. 6, 65-71.

1) As of 1 July 1977 Faculty of Vet. Med. Sw. Univ. Agr. Sci.