

The effect of rapeseed and sunflower cakes on performance and composition of colostrum and milk in sows

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ABSTRACT

Reproductive performance and composition of colostrum and milk were compared during two reproductive cycles on 36 sows fed soyabean, rapeseed or sunflower products. Total replacement of soyabean meal and oil during pregnancy, and partial replacement during lactation, by rapeseed cake and oil or sunflower cake and oil, did not affect reproductive parameters or colostrum and milk composition.

KEY WORDS: sow, rapeseed, sunflower, cake, colostrum, milk

INTRODUCTION

Rapeseed and sunflower press cakes have higher fat and energy contents than the respective meals. In spite of their high fibre content they may be considered valuable substitutes of soyabean oilmeal (SBM) in sow diets. The increased fat content in sow diets can influence milk composition (Migdał and Kaczmarczyk, 1989; Schöne et al., 1998).

The objective of the study was to determine the effects of substituting SBM and oil with rapeseed or sunflower cakes and oils in sow diets on their reproductive performance and composition of colostrum and milk. SBM was replaced totally or partly in diets fed during pregnancy and lactation, respectively.

MATERIAL AND METHODS

The experiment was carried out during two reproductive cycles on 36 crossbred (Polish Landrace × Polish Large White) multiparous sows. The sows

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were mated with Duroc boars and allotted to 3 groups of 12 animals. During pregnancy, the animals from group I (control) were fed a standard diet containing 4.5% SBM and 1% soya oil whereas in the experimental diets, SBM and oil were replaced by 7.5% rapeseed cake (RPC) or 8% sunflower cake (SFC) fed to groups II and III, respectively. During lactation, the standard diet for the control group contained 18 % SBM and 5% soya oil. In the diets for experimental groups, SBM and soya oil contents were reduced and were supplemented with either 10% RPC and 4% rapeseed oil (group II) or with 10% SFC and 3.5% sunflower oil (group III). The diets were isoprotein and isoenergetic. SBM, RPC and SFC contained 44.3, 29.9 and 27.0% protein, and 6.7, 10.3 and 23.9% crude fibre, respectively. The RPC contained 14.9 μM glucosinolates per g DM (Krasucki et al., 2004). Four sows were kept per pen during pregnancy, during lactation they were maintained individually. The animals were fed according to the Nutrient Requirements of Pigs (1993), feed intake was controlled. The sows were weighed at mating, before and after parturition. Piglets were weighed at birth, on days 21 and 28 of life (at weaning). Colostrum samples were taken from 6 sows on the first day of lactation and milk samples on days 7, 14 and 21.

Composition of milk and colostrum was determined according to standard methods. Fatty acids in feed, colostrum and milk fat were determined by gas chromatography on a GC 505 apparatus. The results were subjected to statistical analysis (ANOVA) using Statistica Software, Student's t-test.

RESULTS

As there were no significant differences between results obtained in two reproductive cycles, the means from two cycles are given. The mean body weight of sows at mating was 183.8 kg, they gained on average 45.4 kg during pregnancy and lost 18.6 kg at parturition and 14.8 kg during lactation. The body weight gains and losses did not differ among the groups. The number and body weight of piglets on the first, 21st and 28th day of life also did not differ among the groups (Table 1). The fatty acid composition of oilseed products was typical. The diets did not affect the composition of milk and colostrum or the proportions of fatty acids (Table 2) except for a tendency towards a higher content of oleic and lower content of linolenic acids in both colostrum and milk fat of sows fed the RPC diet. Consequently, slightly higher MUFA and lower PUFA contents in colostrum and milk were found in this group.

TABLE 1

Reproductive performance

Item	Group			SEM
	SBM	RPC	SFC	
Number of piglets				
live-born	10.84	10.60	10.51	0.32
day 21	10.42	10.16	10.08	0.44
day 28	10.16	9.86	9.72	0.29
Piglet mortality up to day 28 of life, %	6.18	7.00	7.48	0.21
Litter weight, kg				
at birth	14.41	13.82	13.62	0.65
day 21	65.44	62.97	62.39	2.64
Body weight of piglets, kg				
at birth	1.33	1.31	1.30	0.02
day 21	6.28	6.20	6.19	0.12
day 28 (weaning)	7.73	7.55	7.48	0.31

TABLE 2

Chemical composition of sow colostrum and milk, g kg⁻¹

Item	Colostrum			SEM	Milk			SEM
	group				group			
	SBM	RPC	SFC		SBM	RPC	SFC	
Dry matter	238	232	230	7	198	198	198	8
Crude protein	116	113	113	3	56.4	55.4	54.6	2
Lactose	37.6	36.2	35.2	1.8	52.1	51.8	52.0	2.2
Crude ash	6.8	6.6	6.4	0.2	8.3	8.1	8.2	0.2
Crude fat	66.6	66.3	65.5	2.2	79.3	78.1	77.2	4.6
Fatty acids, %								
SFA	35.4	34.7	34.8	2.6	38.9	38.7	38.6	2.8
UFA	64.6	65.3	65.2	2.3	61.0	61.3	61.4	2.8
MUFA	44.9	46.6	45.3	1.9	45.3	46.4	45.7	2.1
PUFA	19.7	18.7	19.8	1.2	15.8	14.9	15.7	0.9
n-6 PUFA	18.7	17.5	18.9	1.4	14.6	13.7	14.7	0.3
n-3 PUFA	0.98	1.03	0.92	0.15	1.12	1.18	0.96	0.14
n-6/n-3 PUFA	19.1	17.0	20.5	1.5	13.0	11.6	15.3	0.8

DISCUSSION

The oils differed in fatty acid profiles, with the most favourable n-6 to n-3 proportion in rapeseed. The results obtained in the group fed the diet with rapeseed cake are similar to those reported by Schöne et al. (1998), who, giving 40 g rapeseed oil or 100 g full-fat rapeseed per 1 kg sow diet, did not find any effect on the number or weight of piglets. There are no available publications on

the use of sunflower cake in sow nutrition. The introduction of rapeseed fat to the sow diets usually increases the UFA content in colostrum and milk (Migdał and Kaczmarczyk, 1989). Despite the substantial differences in the fatty acid composition of the oils used (soyabean, rapeseed, or sunflower), the changes in fatty acid composition of colostrum and milk were not large. It may indicate the importance of fatty acids synthesis in the mammary gland.

CONCLUSIONS

The entire (pregnancy) or partial (lactation) replacement of soyabean products (SBM+soyabean oil) in sow diets by the other seed oil products, rapeseed (RPC+rapeseed oil) or sunflower (SPC+sunflower oil), did not significantly influence sow reproduction indices or colostrum and milk composition.

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