

EFFECT OF FEEDING LOW-GLUCOSINOLATE RAPESEED OIL
MEAL ON REPRODUCTIVE PERFORMANCE OF RATS

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The objective of the experiment was to assess the effect of long-term feeding rapeseed oil meal from Polish double-low winter rape on the breeding performance of rats and on the quality of offspring.

1. Materials and methods.

1.1. Experimental design and procedure.

63 females and 45 males of laboratory rats of IFZ_{Jaz} strain at the age of 23-26 days were divided into three groups on the basis of weight and origin. Litter-mates of each sex were evenly distributed among the groups; within each group the males were taken from different litters than females. The groups were randomly allotted to three following treatments: both females and males were fed throughout the whole experiment on soybean control diet /group S/ or rapeseed diet /group R/, males were fed on rapeseed and females on soybean diet /group RS/.

All the animal were mated at the same time, four series of litters from each group were obtained.

1.2. Diets.

The diets were composed of commercial feed for laboratory rats /80.0/, vitamin-mineral premix /0.2/, wheat meal /10.8 in diet S and 9.8 in diet R/ and either soybean /9.0, diet S/ or rapeseed oil meal /10.0 per cent, diet R/. One batch of rapeseed oil meal produced from double-low rapeseed 1984 crop was used; the glucosinolate content in meal was as follows: gluconapin 0.3, glucobrassicinapina 0.0, progoitrin 2.4 $\mu\text{M/g}$.

1.3. Measurements.

The following measurements were taken as the criteria of animal response to the experimental feeding: body weight changes of dams during gestation and lactation, total and mean number and body weight of pups born and weaned at 21 days of age.

The data concerning number and weight of pups were submitted to statistical analysis /Harvey, 1960/.

2. Results.

2.1. Body weight of dams.

Total net gain between the first and fourth mating was the same in females fed on soybean and rapeseed diet /Table 1/.

2.2. Number of pups born and weaned.

Total number of pups born and weaned depends on the number of litters and on the number of pups per litter. Number of litters born was similar and that of weaned was the same in all three groups /Table 2/.

Total number of pups born during the whole experiment /Table 3/ was the highest in group R and the lowest in S. This difference was mainly due to the higher number of pups per litter both in R and in RS group. The mean number of pups per litter at birth was the only parameter affected by treatment and was significantly higher in R and RS than in S group. The difference in total number of pups born in group S and R was observed throughout the whole experiment, it decreased gradually from 19 per cent in the first to 11 in the last cycle.

The lack of difference in the size of litter between group R /both sexes on diet R/ and group RS /only males on diet R/ as well as significant difference between group S /both sexes on soybean/'and RS indicates that positive effect of treatment on litter size at birth was connected with feeding rapeseed to males and not to females.

Total number of pups at weaning /Table 4/ was also higher in RS and R than in S group, the difference was however smaller than at birth because of higher mortality

rate during suckling period, particularly in R group /Table 5/. During first three cycles and during the whole period the mortality rate was lower in S than in R and RS groups, which may be partly explained by smaller size of litters in control group. However, mortality was higher in R than in RS group in spite of similar size of litter at birth.

2.3. Body weight of pups at birth and at weaning.

Mean body weight of pups born and weaned did not differ between the treatments /Table 3 and 4/ in spite of smaller litter size in group S at birth and at weaning.

Conclusions - main results.

Feeding 10 per cent of low-glucosinolate rapeseed oil meal to female and/or male rats as compared to 9% of soybean resulted in significant increase of litter size at birth /11.22 and 11.26 vs. 10.00 pups/, nonsignificant increase of litter size at weaning /10.57 and 10.80 vs. 9.85/ and increase of mortality rate during suckling period. Feeding of rapeseed meal did not affect body weight of females, number of litters born and weaned and mean weight of pups at birth and at weaning.

B i b l i o g r a p h y

1. Harvey W.R., 1960 - Least - squares analysis of data with unequal subclass numbers.
U.S. Dept. of Agriculture, ARS.

Table 1. Net weight gain between consecutive matings, g

Diet	Group	I-II	II-III	III-IV	I-IV
Soybean	S	48	29	14	91
	RS	44	29	23	96
Rapeseed	R	49	34	12	95

Table 2. Total number of litters born and weaned

Group	No of matings	Litters born		Litters weaned	
		number	% of matings	number	% of born
S	81	65	80,2	61	93,8
RS	82	65	79,3	61	93,8
R	81	67	82,7	61	91,0

Table 3. Number and body weight of pups at birth

Group	Cycle				Total	No of litters	No of pups per litter	Mean weight g
	I	II	III	IV				
S	209	198	149	94	650	65	10.00 ^a _{1/}	6,33
RS	253	206	143	130	732	65	11.26 ^b	6,39
R	249	231	168	104	752	67	11.22 ^b	6,31

1/ values with different subscript are significantly different

Table 4. Number and body weight of pups at weaning

Group	Number of pups					Total	No of lit- ters	Mean of pups per litter	Mean weight g
	Cycle								
	I	II	III	IV					
S	193	189	135	84	601	61	9.85	35.97	
RS	236	187	112	124	659	61	10.80	36.15	
R	213	205	129	98	645	61	10.57	36.10	

Table 5. Mortality rate of pups during suckling period, %

Group	C y c l e				Total
	I	II	III	IV	
S	7.7	4.6	9.4	10.6	7.5
RS	6.7	9.2	21.7	4.6	10.0
R	14.5	11.3	23.2	5.8	14.2
Total	9.7	8.5	18.3	6.7	10.7