

EFFECT OF HEAT TREATMENT ON LYSINE AND PROTEIN
AVAILABILITY OF LOW GLUCOSINOLATE RAPESEED MEAL IN RATS

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Two different techniques for processing of the double improved rapeseed meal /RSM/ were applied in laboratory scope /J. Sawicki the Gdańsk Polytechnic School/.

The seeds /15% moisture/ were heated prior to pelleting for 0, 5, 10, 20 and 40 min. at 100°C, then oil was pressed out and the meal was extracted with benzine, which was removed by evaporation for 30 min. at 70°C - Meals A, B, C, D, E.

In the alternative procedure the seeds were pelleted prior to oil pressing and were then extracted with benzine and toasted for 10, 20, 30 min. at 100°C, for 30 min. at 115°C and 30 min. at 150°C respectively meals F, G, H, I, K.

The available lysine was estimated by the method of Carpenter. In all the samples /A - K/ the protein efficiency ratio of RSM was measured in the 24 days - old Wistar rats /10 per group/ during the 28 day experiment.

The casein + 1% methionine - control diet was used.

The highest available lysine content /5,68 and 5,65%/ was found in the samples B and C, whereas the samples A /not heated/ and D, E, F, G, H, I, K heated longer than 10 min. showed significantly lower available lysine content of 4,30 - 4,88%. The highest body mass gain /126,5; 103,0; 106,6 g/ and the highest PER values /3,43; 3,30; 3,28/ obtained with

the samples B, C and F did not differ significantly from those on the casein control diet, whereas PER coefficients with the remaining samples were significantly lower.

Conclusion

The time of heating should not be longer than 10 min. and temperature should not exceed 100°C i.e. the temperature sufficient for myrosinase inactivation and not decreasing lysine availability.

Table 1
Heat treatment of double rapeseed

Whole seeds	rapeseed meal after pressing and oil extraction
Sample steamed	
Procedure I	
A	0 min. 30 - 70°C
B	5 min. 30 - 70°C
C	10 min. 30 - 70°C
D	20 min. 30 - 70°C
E	40 min. 30 - 70°C
Procedure II	
F	non treated toasted: 10 min. - 100°C
G	- 20 min. - 100°C
H	- 30 min. - 100°C
I	- 30 min. - 115°C
K	- 30 min. - 150°C

Table 2

Composition of rapeseed meal following the heat treatment

Sample	moisture / % /	crude protein / % /	available lysine /E/100E protein/	alkenyl glucosinolates /mg/kg/
Procedure I				
A	12,7	38,66	4,47	0,78
B	13,0	38,04	5,56	1,15
C	13,0	38,02	5,65	1,15
D	12,1	39,40	4,88	0,99
E	8,9	40,2	4,49	0,62
Procedure II				
F	12,8	39,4	4,85	0,79
G	13,2	39,5	4,79	0,79
H	10,8	39,9	4,65	0,61
I	11,5	40,1	4,70	0,94
K	7,0	42,1	4,30	1,03

Table 3.

Biological effects of heat treatment of double
improved rapeseed meal in rats / 28 days
experiment - 10% RPM protein /.

Sample	Body mass gain	Feed intake	PER	FER
control casein +1% methionine	/g/28 d/ 115,6 /a/	305 /a/	3,61 /a/	2,74 /a/
A	84,0 /b/	285 /b/	2,93 /b/	3,44 /b/
B	126,5 /a/	367 /a/	3,43 /a/	2,93 /a/
C	103 /a,b/	310 /a,b/	3,30 /a/	3,02 /a/
D	95,7 /b/	322 /a/	2,95 /b/	3,41 /b/
E	87,3 /b/	282 /b/	2,90 /b/	3,31 /b/
F	106,6 /a/	323 /a/	3,28 /a/	3,06 /a/
G	86,2 /b/	300 /a/	2,77 /b/	3,70 /b/
H	86,6 /b/	277 /b/	3,01 /b/	3,22 /b/
I	95,2 /a/	301 /a/	3,14 /b/	3,23 /b/
J	96,1 /a/	306 /a/	3,12 /b/	3,21 /b/

Numbers with the same letters do not differ significantly
/p < 0,05/ by Duncan's multiple range test.