

THE INFLUENCE OF EXPANDING 00 - RAPESEED MEAL ON FEEDING VALUE AND GROWTH PERFORMANCE OF BROILERS

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ABSTRACT

The effect of expanding 00-rapeseed meal (RSM) on the feeding value and growth performance of broiler chickens was studied by analytical methods (crude nutrients, glucosinolates, aglucones) and by one balance- and two growth experiments with broilers. By expanding the RSM at inclusion levels of 15 and 30 % in the diet the growth performance was improved and the thyroid weights were diminished.

INTRODUCTION

The feeding - value of low glucosinolate rapeseed varieties and their by-products of oil manufacturing is still limited by glucosinolates and fiber substances. Therefore technical procedures to reduce these ingredients are important. The effect of expanding was studied.

EXPERIMENTAL

Materials and Methods

Descriptions of an expander and of the expanding procedure were published by Peisker (1990) and Heidenreich (1993). During the expanding procedure the rapeseed meal (RSM) was heated till to 120 °C and exposed to a pressure of 24 bar. The feed value of the not treated and expanded RSM was studied by analysis of crude nutrients, glucosinolates and aglucones (nitriles by Zust, Ljubljana; VOT, ITC by Matthäus Münster). Furthermore two growth trials with hybrid broiler chicks (1.-35. day of live) and one balance trial (Sampling period 17.-22. day of live) were carried out. The broilers were housed in cages. In growth trials per diet were used 10 cages with 3 broilers, in balance trial 10 cages with 1 broiler. The excreta was frozen and lyophilized prior to analysis. Energy content was determined with a calorimeter. The digestibility of fibers was measured. After the basal diet was tested 30 % of RSM were substituted not treated or expanded for an equal part of basal diet.

Results and Discussion

The analysis of the different RSM show a small decrease of crude fiber, crude cellulose and ADF content, NDF and NEF values were increased. The glucosinolate content was not changed by expanding. Aglucones were not detected (Table 1).

Table 1. Nutrient content of not treated and expanded rapeseed meal (RSM) in broiler growth experiments

	Experiment I		Experiment II	
	not treated	ex-panded	not treated	ex-panded
Dry matter <u>in percent of dry matter</u>	87,63	88,01	87,62	87,95
Ash	7,19	7,86	8,89	8,61
Crude protein	39,42	39,29	39,95	40,38
Crude fat	4,79	5,10	1,84	2,37
Crude fiber	14,31	12,44	12,87	11,54
NFE	34,29	35,31	36,45	37,10
Starch	7,44	7,41	7,30	7,40
Sugar	9,06	8,98	7,87	8,79
ME MJ 1)	10,16	10,24	9,06	9,45
NDF	28,89	29,30	27,14	27,73
ADF	23,69	22,17	19,27	17,74
Crude cellulose	15,25	14,07	12,17	11,16
Lignin	8,44	8,11	7,11	6,60
Total Alkenyl GSL	7,3	7,2	4,6	5,8
Total Indol GSL	0,4	0,5	0,2	0,2
Total GSL (91% DM)	8,1	8,2	5,2	6,6

1) calculated from crude nutrients by regression equation

The content of metabolizable energy of RSM determined indirect by substitution method was not changed by expanding. Digestibilities of crude fiber and NDF were increased (Table 2).

Table 2. Results of the balance experiment with broilers

	Metabolizable energy		Apparent digestibility		
	classical ME MJ/kg	N-corrected ME MJ/kg	Crude fiber	ADF	NDF
basal diet	11,02	10,60	8,8	-5,5	39,4
RSM not treated	9,67	8,85	10,1	-1,6	10,4
RSM expanded	9,55	8,57	14,8	-0,5	15,0

The inclusion of 15 % not treated RSM in the mixtures caused that the live weights of broilers at 35. day decreased in trials I or II about 4 or 2 percent (Table 3). By expanding of RSM this depressions were removed. By 30 % RSM in the diets the live weights dropped about 5 to 6 %. Expanding overcomes these depressions too and there remained only a small growth difference from 1- 2 %.

Both experiments show equal trends, although there were differences in growth level. The growth depressions are partly caused by a lower feed intake, which was in some groups increased by expanding. In trial I the thyroid gland weights were increased by RSM feeding and

dropped by expanding, although there were no differences in glucosinolate content and aglucones were not detected. The liver weights were increased by expanding the feed. It must be concluded, that the growth promoting effect of expanding is caused by a decrease of fiber substances and an increase of their digestibility. Beside it, strumigenic substances were destroyed, which could not yet be detected by analytical methods.

Table 3. Growth experiments with broiler chickens

Group	1	2	3	4	5
	reference diet (without RSM)	15 % RSM not treated	15 % RSM ex- panded	30 % RSM not treated	30 % RSM ex- panded
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Trial I					
<hr/>					
live weight					
21. day g	724	687	721	666	696
35. day g	1662	1591	1663	1587	1639
s ±	134	163	159	124	159
<u>feed intake</u>					
1.-35 d g	73	69	73	69	65
feed/gain kg	1,58	1,56	1,58	1,57	1,43
thyroid gland weight per kg body weight g	83,1	98,7	87,5	55,6	43,7
liver weight per kg body weight g	20,9	21,7	23,0	24,1	25,8
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Trial II					
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live weight					
21. day g	752	727	768	696	723
35. day g	1594	1567	1637	1495	1586
s ±	203	203	151	183	186
<u>feed intake</u>					
1.-35 day g	71	69	70	68	70
feed/gain kg	1,61	1,59	1,53	1,64	1,58
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