

## INFLUENCE OF DIFFERENT TECHNICAL TREATMENTS OF RAPE SEED ON THE DIGESTIBILITY OF CRUDE NUTRIENTS AND ON THE METABOLISABILITY OF ENERGY AS DETERMINED WITH BROILERS AND LAYING HENS

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### ABSTRACT

The influence of different technical treatments of whole rape seed on the energetic feed value and on digestibility of crude nutrients were tested in balance trials carried out on broilers and laying hens. Such technical treatments were different grinding grades and different heat treatments. Marked effects on feed value were observed for the different treatments.

### INTRODUCTION

The importance of rape seed as component of feed mixtures for broilers and laying hens is dependent on several factors. The problems resulting from the occurrence of several antinutritive substances in the rape seed is only one side of the feed value for broilers and laying hens. The other side concern the knowledge of digestibility of nutrients and the energetic feed value in dependence of technical treatment procedures of the seed if an effective use is to be guaranteed.

### EXPERIMENTAL

#### Material and methods

The technical treated rape products obtained from one charge of rape seed (variety "Lirajet") are listed in table 1. These products were tested on broilers (B) and in part on laying hens (H) by using the methods of balance trials based on total excreta sampling procedure described by Schiemann (1981). The trials were designed as difference procedures by using the control diets and the test-diets (control diet substituted weight for weight by 30 % of the single rape products) as basis for the difference. Crude nutrients were analysed for feed and freeze dried excreta in order to determine crude nutrient digestibility coefficients. The chemical separation of nitrogen originated from faeces and urine in the excreta was necessary for calculating the apparent protein digestibility. The so-called alpha-amino-N method applied for this separation is described by Pahle et al. (1983).

The N-corrected apparent metabolisable energy ( $AME_N$ ) was calculated by the results of the N-balance and the gross energy of feed and excreta determined at a automatic adiabatic bomb-calorimeter.

TABLE 1. Description of the tested variants

Variant	Abbreviation
Control-diet, a typical mixture for broilers or laying hens	CO
Rape seed, not ground or treated	S
Rape seed, not ground, treated with mikronizer at 105°C	S-M-105°C
Rape seed, roughly ground on a roller mill	S-rg
Rape seed, fine ground on a roller mill	S-fg
Rape seed, flaked on a roller mill	S-fl
Rape seed, flaked, treated with mikronizer at 105°C	S-fl-MN-105°C
Rape seed, flaked, treated with mikronizer at 125°C	S-fl-MN-125°C
Rape seed, flaked, hydrothermal treated at 98°C	S-fl-HT-98°C
Rape seed, flaked, hydrothermal treated at 125°C	S-fl-HT-125°C
Rape seed, flaked, treated with jet sploder at 105°C	S-fl-JS-105°C
Rape seed, flaked, treated with jet sploder at 125°C	S-fl-JS-125°C

### Results and discussion

The  $AME_N$  - contents and the digestibility-coefficients both of the control variant and of the rape products as calculated from the difference procedure are summarised in table 2. The values represents mean values for 8 broilers and 6 laying hens per variant, resp..

TABLE 2. Influence of different technical treatments of rape seed on  $AME_N$ -content and digestibility coefficients for broilers and laying hens

Variant	Mean particle size (mm)	$AME_N$ (MJ/kg dry matter)		Apparent digestibility (%)					
		B	H	Organic matter		Crude fat		Crude protein	
				B	H	B	H	B	H
CO		13.5	12.6	77.7	78.9	67.3	77.6	88.4	84.7
S		12.4	18.6	29.2	40.1	26.5	43.9	62.2	69.5
S-M-105°C		15.9		35.5		31.8		63.9	
S-rg	1.18	15.7	17.1	49.4	45.2	46.1	50.0	68.5	68.8
S-fg	0.47	22.0	23.3	65.5	57.0	83.0	80.0	76.2	75.2
S-fl	0.65	21.1	22.6	63.8	57.7	72.9	77.6	78.2	75.7
S-fl-MN-105°C	0.74	19.7		61.7		69.7		78.6	
S-fl-MN-125°C	0.73	19.6		61.1		70.6		72.8	
S-fl-HT-98°C	1.16	18.8		62.4		61.3		76.4	
S-fl-HT-125°C	1.15	19.9		60.2		67.9		67.4	
S-fl-JS-105°C	0.79	21.8		63.1		68.1		80.5	
S-fl-JS-125°C	0.72	20.7		60.1		73.0		68.5	

The results for the graded degrees of grinding ( S, S-rg, S-fg, S-fl ) of rape seed indicate a marked increase in digestibility of organic matter and consequently in  $AME_N$ -content both for growing ( Broilers ) and adult ( Laying hens ) birds. The increase in digestibility of organic matter is mainly caused by the improved digestibility of crude fat indicating a better availability of the cell bound fat by grinding procedures. A thermal treatment ( Mi-

kronizer, hydrothermal, jet sploder ) of the flaked seed resulted in no improvement or a small decrease in the AME<sub>N</sub>-values for broilers. The same conclusion can be drawn for the digestibility of dry matter. There seems to be no better fat availability by thermal treatment compared to the untreated flaked seed ( S-fl ) indicated by the fat digestibility coefficients. Within the different thermal treatments, an increase in temperature resulted in a small improvement in fat digestibility up to the level of the untreated flaked seed ( S-fl ) for the case of the variant S-fl-JS-125°C. On the other hand, for all thermal treatments a marked decrease in protein digestibility was recorded if the temperature procedure was increased indicating a temperature caused heat damage of protein. These opposite directions for the fat and protein digestibility resulted in only small changes in digestibility coefficients for the organic matter and consequently in the AME<sub>N</sub>-contents of all thermal treated rape seed variants.

## CONCLUSIONS

From the results it can be concluded that a high degree of grinding ( fine grinding on roller mill ) is required both for broilers and laying hens if a maximum energy and nutrient gain from the seed is wished. A thermal treatment of the seed is not required if an evaluation for rape seed is made for the AME<sub>N</sub>-content and the digestibility of the organic matter.

## REFERENCES

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