

## NUTRIENT DIGESTIBILITY AND METABOLIZABLE ENERGY OF RAPESEED PRODUCTS IN PIGS

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## ABSTRACT

Rapeseed meal, solvent extracted (RSM), rapeseed press cake (RPC) and rapeseed (RS) - *Brassica napus* winter type - were tested in three digestibility experiments with a total of 32 pigs. Apparent digestibility of organic matter (OM) amounted to 73 %, 70 % and 77 % in RSM, RPC and RS respectively. In case of similar OM digestibility metabolizable energy (ME) depends mainly on fat content (F), as ether extract [per kg dry matter]: 48 g F = 11 MJ ME for RSM, 180 g F = 14 MJ ME for RPC, 450 g F = 20 MJ ME for RS. In rapeseed products 1 % crude fat as replacement of fat free dry matter corresponds with about 0.2 MJ ME for pigs.

## INTRODUCTION

Rapeseed meal solvent extracted (RSM) contains much protein, however, hulls lower digestibility of nutrients and energy. Rapeseed (RS) with 40 % fat is an "energy feedstuff" but at present to expensive. Rapeseed press cake (RPC) with 10 % to 20 % fat could combine advantages of RSM and RS, but there are made only few digestibility experiments with RPC up to now.

The main topic of present investigation deals with the composition and nutrient digestibility of rapeseed press cake. The analytic results and data of digestibility experiment were compared with earlier reports of similar experiments with RSM (SCHÖNE et al., 1992) and RS (SCHÖNE et al. 1993) in pigs.

## EXPERIMENTAL

The *Brassica napus* material, winter type, differed with regard to variety and glucosinolate content (per kg dry matter, DM): RSM line "BNW 1.87-86" (48 mmol), RPC "Falcon" (19 mmol), RS "Madora" (21 mmol). RSM was tested with 2x8 female pigs (German Landrace x Large White, live weight: 52 kg), in a barley wheat diet or in a semisynthetic diet. RS and RPC were tested each with 8 male castrated pigs (Pietrain x German Landrace x Large White, mean live weight 69 kg or 86 kg), in a barley diet. Some conditions differed between experiments, but, the rapeseed products' level tested was always high - 480 g RSM kg<sup>-1</sup> diet, 490 g RS kg<sup>-1</sup> diet, 490 g RPC kg<sup>-1</sup> diet. The digestibility of organic matter (OM) and crude nutrients was calculated as difference between diet with rapeseed product and basal diet.

## RESULTS AND DISCUSSION

RS is dominated by fat (Table 1). The stepwise withdrawal of fat enriched more or less protein or fibre in RSM or RPC. In fat free DM the

crude protein content varied from 391 (RPC) to 435 g kg<sup>-1</sup> (RSM), the crude fibre content between 124 (RC) and 163 g kg<sup>-1</sup> (RS).

Table 1. Selected constituents of tested rapeseed products (g kg<sup>-1</sup>)

	Meal Solvent extracted	Press cake	Seed
Dry matter	888	904	937
<u>In the dry matter (DM)</u>			
Crude protein	414	321	218
Ether extract	48	180	455
Crude fibre	141	102	89
N-free extract	321	334	198
Crude "carbohydrates" <sup>1)</sup>	462	436	287
Crude ash	76	63	40
Neutral detergent fibre	323	277	not determined
Acid detergent fibre	208	197	" "
Crude hemicellulose	115	80	" "
Crude cellulose	119	116	" "
Crude lignin	89	81	" "

<sup>1)</sup>almost only fibre compounds

The apparent protein digestibility was similar in RSM and RS, that of ether extract agreed between RPC and RS and the crude "carbohydrates" digestibility was nearly the same in RSM and RPC (Table 2).

Table 2. Apparent digestibility of organic matter and crude nutrients in rapeseed products tested %

	Meal solvent extracted	Press cake	Seed
Organic matter	73	70	77
Crude protein	82	69	79
Ether extract	50	78	77
Crude fibre	41	15	57
N-free extract	79	84	85
Crude carbohydrates	68	68	76

The lower digestibility of RPC protein can not be explained at present. In RSM the decreased apparent fat digestibility results from higher level of endogenous fat relative to fat intake. Due to low intake level the differences in crude fibre digestibility should not be over-estimated. Fat of RPC and RS did not suppress the crude "carbohydrate" digestibility. The lower fibre level of RS may have permitted a better colon fermentation.

Metabolizable energy (ME) of rapeseed products was calculated using the ROSTOCK's equation (SCHIEHMANN et al. 1971) with correction for higher contents of sugar and bacterially fermentable fibre.

The 14.14 MJ kg<sup>-1</sup> DM ME of RPC is similar to barley (14.60 MJ kg<sup>-1</sup>). RPC is energetically better than solvent extracted meal, however it has significantly less ME than rapeseed. With similar organic matter digestibility the ME of rapeseed products depends on fat content (Fig.). According to these findings 10 g fat content (per kg DM in exchange against fat free matter) are equivalent to 0.2 MJ ME in rapeseed products.

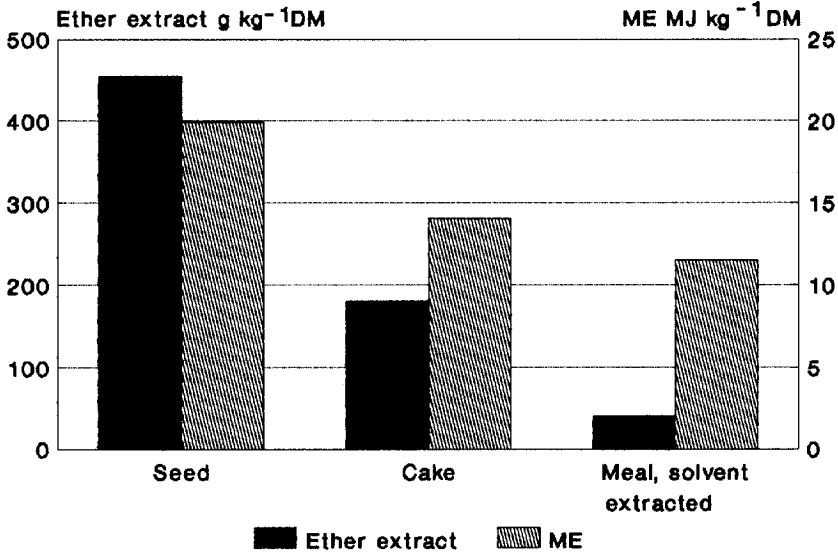


Figure: Content of fat (as ether extract) and metabolizable energy in rapeseed products, per kg dry matter, DM

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