

Proposals of short nutritional evaluation test in small samples of low glucosinolate rapeseed in the early stages of plant selection

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Introduction

It is known that rapeseed even with low glucosinolate contents have the other compounds of antinutritive character, namely phenolic derivatives, fiber or phytates, which might inhibit the feed intake and growth efficiency of animals.

The nutritional evaluation of small samples of new strains of double improved rapeseed in the early stages of selection might be important.

For that purpose the two week growth test on rats is proposed.

Materials and methods

The animals were fed with full fat rapeseed of different strains as the only source of protein and the main source of energy. The diets were supplemented with salt and vitamin mixtures. Half kg of rapeseed sample were steam autoclaved for 15 min for myrosinase deactivation, than the corresponding amount of wheat starch was added and the mixture was ground on laboratory mill. The casein supplemented with 1% of methionine, with 20% of O-erucic rapeseed oil diet served as the control in every set of 10 experimental groups of six rats per each sample.

The body mass gain, diet intake, PER and feed conversion coefficient served as the parameters of nutritional quality evaluation.

The thyroid weight was measured after 2 weeks of experimental period.

8 samples of rapeseed varieties of different glucosinolate content 0.22 - 7.31 mg/g of seeds/ and 42 strains of low glucosinolate /0.13 - 0.79 mg/g of seeds/ were tested.

Results and discussion

The results are presented in Table 1 and 2. The statistical evaluation of obtained data, showed highly significant negative correlation / $r = -0.86$ / between all biological coefficients and the glucosinolate content in rapeseed varieties while of $r = -0.18$ correlation coefficient in the improved rapeseed strains.

The statistical differences were also found among 42 strains of double improved rapeseed in relation to body mass gain /extrema of 37 g and 63 g per 2 weeks/ and the feed conversion ratio from 246 to 348 g feed intake per 100 g of body mass gain.

Very close PER coefficients on double improved rapeseed strains to the control casein diet was shown with not significant differences among double improved rape strains, which was in agreement with a-acid composition in samples of lowest and highest PER values.

Table 1. Nutritional value of seeds of new strains of winter rapeseed compared to Start "00" and Górczański cultivars

Protein source	Glucosinolates /mg aglycone/g seeds/	Body weight gain /g/rat/day/	Feed conversion /g/100g b.wt.g./
Double improved strains	0.13 ÷ 0.34	2.9 ÷ 3.9	265 ÷ 330
cv. Start "00"	0.63	3.4	315
cv. Górczański	6.77	0.3	1430

Table 2. Egzogenic amino acid content in protein /gms/16g N/ of chosen strains of rapeseed

Amino acid	Strain No.						
	1115/6	1356/3	24/5	33/2	53/2	1370/1	836/5
CYS	2.09	2.01	2.28	2.26	2.20	2.19	2.26
MET	1.95	2.25	2.08	2.05	2.10	2.05	2.14
THR	4.61	4.59	4.52	4.64	4.71	4.44	4.91
VAL	5.78	6.03	5.40	6.22	5.61	6.23	5.52
ILE	4.83	4.49	4.33	4.41	4.58	4.22	4.50
LEU	7.78	7.67	7.42	7.44	7.61	7.31	7.66
PHE	4.53	4.31	4.35	4.44	4.44	4.31	4.35
HIS	2.86	2.80	2.95	2.87	2.77	2.82	2.94
LYS	6.22	6.26	6.55	6.53	6.48	6.33	7.01
ARG	6.48	6.55	6.98	6.99	6.36	6.00	5.84
PER values	3.15	3.25	4.00	4.08	3.60	3.48	3.75