

NUTRITIONAL EVALUATION OF RAPESEED PROTEIN CONCENTRATES

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A new technology has recently been achieved in Poland, which allows protein concentrate for human use to be produced from high glucosinolate varieties of rapeseed. The nutritional evaluation of these amorphous rapeseed protein concentrates after the texturization process, alone and blended with soybean flour, have been carried out.

MATERIALS AND METHODS

Investigations were carried out on the following material:

1. Rapeseed meals (RSM) and rapeseed protein concentrates (RPC), obtained from rapeseed of Janpol var. (N^o 1, N^o 2) and Skrzyszowicki var. (N^o3).
2. RPC₃ after UNI-TEX and extrusion cooking processes conducted by Wenger International Inc.
3. RPC₃ blended with SBF (1:1) after UNI-TEX process.

RESULTS AND DISCUSSION

Amino acid composition of RPC showed little - if any - change in relation to the amino acids of rapeseed meal and was very well balanced in relation to all protein patterns. The first limiting amino acids were isoleucine for rapeseed products and sulphur containing amino acids for SBF and RPC-SBF blend. Although distinctly lower in total EAA, the RPCs were equal to casein in EAAI. Their good balance in EAA was also evident in the high level of CS and PS superior to both casein and SBF showed a marked deficiency in methionine + cystine. UNI-TEX and extrusion processes of RPC caused the decrease in content of EAA and EAAI levels and, due to losses of lysine, tyrosine and sulphur containing amino acids a protein score of RPC was slightly affected (Table 1).

TABLE 1
CHEMICAL INDICES AND BIOLOGICAL DATA OF RPC

Protein source	CS	EAAI	Protein score	NPU ^x	Weight gain g/28 day	PER ^x
RSM ₁	56	73	92	30,9	3,6 [±] 2,1	0,52 [±] 0,17
RPC ₁	56	71	93	68,4	83,8 [±] 4,0	3,11 [±] 0,08
RPC ₂	56	68	93	68,1	82,1 [±] 3,6	3,00 [±] 0,08
RSM ₃	59	73	91	21,4	-1,6 [±] 4,1	-0,20 [±] 0,46
RPC ₃	68	79	97	74,1	104,5 [±] 5,6	3,30 [±] 0,06
extruded RPC ₃	60	72	92	68,6	95,9 [±] 3,7	2,93 [±] 0,08
UNI-TEX RPC ₃	63	74	94	69,4	102,3 [±] 4,0	3,11 [±] 0,08
UNI-TEX RPC ₃ -SBF	49	70	90	63,5	88,3 [±] 4,8	2,72 [±] 0,09
SBF	40	70	88	58,9	57,6 [±] 3,7	2,23 [±] 0,09

^xcorrected to casein with a PER of 2,50 and NPU of 60.

Diets containing RPC were consumed well but significantly less than the casein control ($P = 0,05$). Textured RPC fed alone or with SBF were consumed at about the same level as casein. The high feed intake of RPC may be due to the complete absence of glucosinolates in those diets. The feed intake of RSM with high level of glucosinolates (13-15 mg/g dry basis of sample) was very limited. The body weight gains for RPC were significantly higher than for casein. Texturation process of RPC did not influence the weight gain of rats, while the extrusion cooking process slightly decreased it.

The PER for RPC ranged from 3.00 for RPC₂ to 3.30 for RPC₃ and was distinctly higher than casein (PER of 2.5). The UNI-TEX process caused decrease by 0.2 unit and extrusion cooking process by 0.4 unit of PER of RPC. The PER for UNI-TEX of RPC + SBF blend amounted to 2,72 and was also higher than casein. There were significant differences between means of PER for each diet ($P = 0,001$). The NPU of investigated proteins confirmed their PER results. The NPU was very high for RPC and was affected by UNI-TEX and extrusion cooking processes. Its value for textured blend of RPC + SBF was superior to casein, too. Compared to PER of 2,23 and NPU of 58,9 obtained for SBF, the nutritional value of soybean protein was distinctly improved by supplementation of rape-seed protein.

CONCLUSIONS

Rapeseed protein concentrates obtained from high glucosinolates seeds showed high PER and NPU values which were associated with well-balanced amino acid composition. Because of high content of sulphur containing amino acids the protein products obtained from rapeseed would be a good source for supplementing other vegetable protein. The ability of RPC to create a good texture could be widely used for the production of meat analogues. Texturation and extrusion cooking processes involved changes in amino acid composition and led to slight decrease of both the chemical indices and biological data of rapeseed protein.

SESSION H / SESSION H / SITZUNG H

FUNCTIONAL PROPERTIES OF RAPESEED OIL AND MEAL PRODUCTS /
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