CHARACTERIZATION OF TWO PROTEIN ISOLATES FROM RAPESEED

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otein isolates having good nutritional properties are obtained
h yield by countercurrent extraction of rapeseed meal with aqueous
hydroxide followed by stepwise isoelectric precipitation (A.S. El
shy et al., 1975, 1977). The present study was devoted to the charac-
tion of the protein isolates Erglu I and II, obtained from the meal
-erucic/low glucosinolate rapeseed, Brassica napus, Erglu.

fatted Erglu meal and the protein isolates Erglu I and II were
ted by sonication with the solvents listed in Table 1. Aliquots
protein extracts were chromatographed on Sephadex G-200. The 12 s
ns and the 1.7 s proteins of rapeseed, used for comparison, were
ed from the Erglu meal by established procedures. The protein
ons were analyzed by disc electrophoresis on polyacrylamide gels
either 0.01 M acetic acid - β - alanine buffer, pH 4.5 or 0.005
-glycine buffer, pH 8.3.

lubility of the rapeseed meal and the two protein isolates in
is aqueous solvents is given in Table 1. It is evident that aqueous
chloride dissolves only 36% and 11%, respectively, of the alkali-
e proteins from the isolates Erglu I and II, but as much as 82% of
kali-soluble proteins from Erglu meal. Fig. 1 shows that the com-
on of proteins, soluble in aqueous sodium chloride, is distinctly
ent for the two isolates. The major components of Erglu I (fractions
d C) correspond to >12 s, 12 s and 1.7 s proteins of the Erglu meal,
tively, whereas those of Erglu II consist almost entirely of the
on corresponding to the 1.7 s proteins. In all the three samples,
action D is found to contain relatively low molecular weight
000) polypeptides and phenolic compounds.

sults given in Table 1 also show that the ammonium acetate/ammonia
dissolves 87% and 69%, respectively, of the alkali-soluble proteins
he isolates Erglu I and II, and practically all of the alkali-
e proteins from the Erglu meal. Gel chromatography (Fig. 2)
s that each protein extract contains, as the major components,
gh molecular weight fraction A having an elution volume similar to
12 s proteins. It should be noted that this fraction is found in
smaller proportions in the corresponding aqueous sodium chloride
ts. In the ammonium acetate/ammonia extract of Erglu meal and
I, small proportions of fractions corresponding to 12 s (B) and
(C) proteins are also detected, whereas in the corresponding
t of Erglu II, only the 1.7 s proteins (C) are found as the minor
ents.

also evident from Table 1 that the urea/Tris-hydrochloric acid
dissolves 94% of the alkali-soluble proteins from the isolate
I and practically all the proteins from the Erglu meal and Erglu
l chromatography (Fig. 3) reveals that all the three extracts
n, as the major components, the high molecular weight fraction A
sponding to >12 s proteins, which are present in much smaller pro-
ns in the corresponding aqueous sodium chloride extracts. Some
minor components in the urea/Tris-hydrochloric acid extracts are

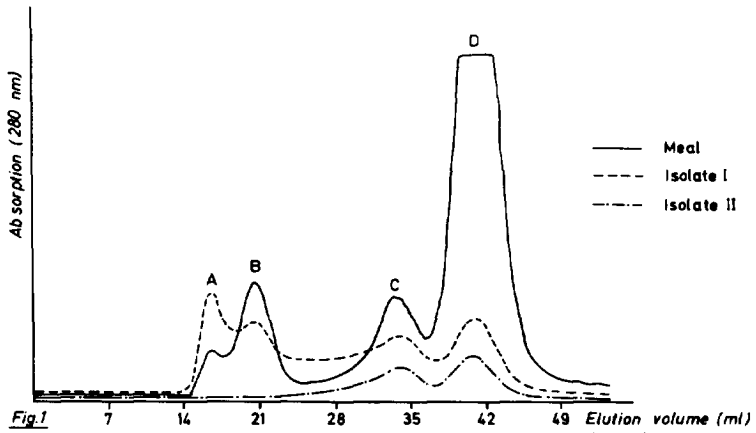

Fig.1 Separation of the extracts with 10% sodium chloride on Sephadex G-200 (1x48 cm)

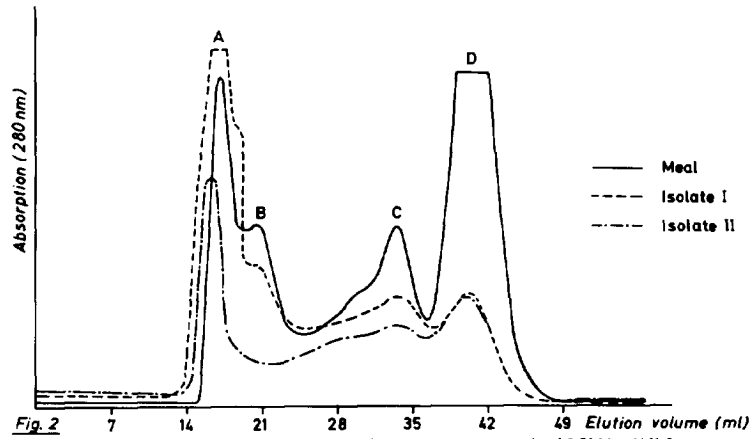

Fig. 2 Separation of the extracts with ammonium acetate/ammonia (0.01 M, pH 11.0 containing 0.1 M NaCl) on Sephadex G-200 (1x48 cm)

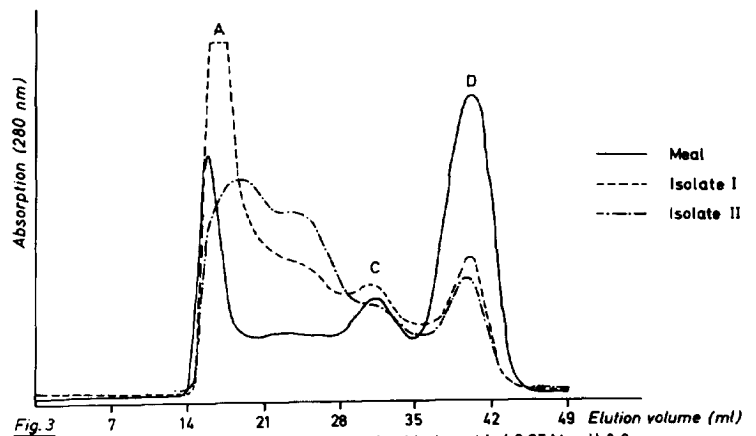

Fig. 3 Separation of the extracts with Tris-hydrochloric acid (0.05 M, pH 8.0 containing 6M urea) on Sephadex G-200 (1x 48cm)

probably the dissociation products of the 12 s proteins.

The high molecular weight fraction (>12 s) in the extracts of the two isolates and the meal, both in ammonium acetate/ammonia buffer and in urea/Tris-hydrochloric acid buffer, are found to contain ribonucleic acids. These fractions are probably protein-ribonucleic acid complexes, which also contain phenolics and possibly acidic carbohydrates (P. Åman and L. Gillberg, 1977). It seems that these high molecular weight complexes are formed during extraction of the proteins at high pH values and low ionic strength of the solvent and/or during the isoelectric precipitation of the isolates.

TABLE 1

SOLUBILITY OF ERGLU MEAL AND PROTEIN ISOLATES ERGLU I AND II IN VARIOUS SOLVENTS*

A: 1 N Sodium hydroxide
B: 10% Sodium chloride
C: 0.01 M Ammonium acetate/ammonia, pH 11.0, containing 0.1 M sodium chloride
D: 6 M Urea in 0.05 M Tris-hydrochloric acid, pH 8.0

Sample	Solvent	Protein dissolved** (% of dry weight of the sample)
Erglu meal	A	39
	B	32 (82)
	C	39 (100)
	D	41
Erglu I	A	77
	B	28 (36)
	C	67 (87)
	D	72 (94)
Erglu II	A	71
	B	8 (11)
	C	49 (69)
	D	90

* 1 g sample extracted with 20 ml solvent by sonication

** According to Lowry et al, using bovine serum albumin as reference protein

( ) Figures represent the proteins dissolved as percent of proteins soluble in 1 N NaOH.

REFERENCES

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