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THE NUTRITIVE VALUE OF THE PROTEINS OF BLENDS OF RED GRAM DHAL, MILK, RICE AND PEAS

RAJAMMAL P. DEVADAS, ROHINI SAMBAMURTHY AND RAJESWARI ROWLANDS

Sri Avinashilingam Home Science College, Coimbatore

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Diet surveys conducted in different parts of India have shown that the diets consumed by the low-income groups of the population consist predominantly of cereals and contain small amounts of legumes, milk and meat.[1–3] Cereals form the main source of proteins in such diets. Among the protein-rich foods available in the rural parts of the country, pulses and oilseeds are the most important.[3] Milk and meat are not available in adequate amounts. The proteins of cereals are of medium nutritive value.[4] Quantitatively also they contain below 10% protein whereas legumes contain nearly 25% protein. The results reported by some workers have shown that the proteins of pulses supplement those of cereals and the proteins of milk supplement those of legumes.[4,5] A mixture of cereals and legumes or legumes and milk can meet the protein needs of preschool children.[6] In the present paper the results of studies on the nutritive value of the proteins of blends of rice and peas, and of red gram dhal and milk have been reported.

Experimental

The protein efficiency ratios of the following proteins were determined by the method of Osborne, Mendel and Ferry[7] (1) skim milk powder (2) red gram dhal (3) a blend (5 : 1) of red gram dhal and skim milk powder and (4) a blend of rice and peas in the ratio of 2.5 to 1. Rice, red gram dhal and peas were powdered and used in the preparation of the diets. The composition of the experimental diets is given in Table I. The protein content (N × 6.25) of the diets was about 8% on the moisture-free basis. Groups of albino rats, (4 rats per group and about 28 days old) were fed on the different diets for a period of 28 days. The PER calculated for each week and for the entire period is given in Table II.

Results and Discussion

The results show that the PER of the sample of red gram dhal (0.58) used in this study was lower than that (1.7) reported by Phansalkar *et al.*[8] It is of interest to note that a blend containing 3 parts

Table I. *Composition of experimental diets (g)*

Ingredients	D_1 (Skim milk powder)	D_2 (Red gram)	D_3 (Red gram + skim milk powder)	D_4 (Rice + peas)
Skim milk powder	21.0	—	5.2	—
Red gram dhal	—	35.8	26.8	—
Rice, raw milled	—	—	—	58.0
Peas, dried	—	—	—	22.0
Corn starch	53.0	38.2	42.0	—
Vitaminised starch	5.0	5.0	5.0	5.0
Salt mixture (Osborne and Mendel)	4.0	4.0	4.0	4.0
Cane sugar	7.0	7.0	7.0	7.0
Butter	10.0	10.0	10.0	10.0
Cod liver oil	1.0	1.0	1.0	1.0
Protein (N × 6.25) content on moisture free basis (%)	8.4	7.8	7.9	8.3

Table II. *The protein efficiency ratio of blends of red gram dhal, skim milk powder, and of rice and peas (4 male rats per group : period — 4 weeks : level of protein in diet 8%)*

Protein sources	Protein efficiency ratio				
	I week	II week	III week	IV week	Average for 4 weeks
Skim milk powder	3.08	2.89	2.45	2.12	2.60
Red gram	0.71	0.62	0.58	0.43	0.58
Red gram proteins (6 parts) + skim milk powder proteins (2 parts)	1.74	1.63	1.38	1.45	1.60
Rice proteins (3.6 parts) + pea proteins (4.4 parts)	2.42	2.04	1.82	1.59	1.98

of red gram protein and 1 part of milk protein had a significantly higher PER (1.6) than red gram proteins alone. A mixture of 3.6 parts of rice proteins and 4.4 parts of pea proteins had a higher PER (1.89) than that of a mixture of red gram and skim milk powder. These results are in conformity with those of Phansalkar *et al*,[8] who reported that a mixture of rice and red gram or Bengal gram or green gram or black gram possessed high PER.

Summary

The protein efficiency ratio of a mixture of red gram dhal and skim milk powder and rice and peas was determined at 8% level of protein intake over a period of 4 weeks. The protein efficiency ratio (PER) of a mixture of 3 parts of red gram protein and 1 part of milk proteins was 1.6 as compared with a value of 0.58 obtained for red gram alone. The PER of a mixture of 3.6 parts of rice proteins and 4.4 parts of pea proteins was 1.80 as compared with a value of 2 60 obtained for skim milk powder.

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