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EVALUATION OF NUTRITIVE VALUE OF PROMISING GENOTYPES OF PIGEONPEA AND HORSEGRAM IN KONKAN

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Three pigeonpea (*Cajanus cajan*) and four horsegram (*Dolichos biflorus*) genotypes were chemically analysed for proximate principles, protein fractions, methionine and tryptophan content in grain. The chemical analysis revealed 19.71 to 26.16 per cent protein, 0.76 to 1.63 methionine and 0.96 to 2.07g tryptophan per 100g protein in grain. The pigeonpea genotype T-21 had the highest protein content of 26.16 per cent, but the methionine and tryptophan contents in its protein were the lowest amongst all the seven genotypes. All the horsegram genotypes had the tryptophan score of more than hundred, indicating that the tryptophan was not limiting in these genotypes. Pigeonpea genotypes were found to be poor in respect of both the methionine and tryptophan. The genotypes T-21 of pigeonpea and ACCK-11 of horsegram had comparatively better distribution of protein fractions in their grain protein and the former had the lowest prolamin content (4.05g/ 100g protein).

Keywords : Amino acid score; *Cajanus cajan; Dolichos biflorus;* Methionine; Tryptophan.

Introduction

Pulses play an important part as a source of dietary protein, energy, minerals and vitamins for the predominantly vegetarian population of India. Grain legume serve as main and cheap source of dietary protein in many parts of the world. They complement cereals in terms of amino acids balance. On an average, food legume contain about 20 to 30 percent protein on dry weight basis and provide about 350 Kcal of food energy per 100g[1]. The pulse proteins are found to be highly deficient in some of the essential amino acids especially the sulphur containing amino acids and tryptophan.

Materials and Methods

The grains of three genotypes of pigeonpea (*Cajanus cajan*) viz. T-21, ACCT-1 and ICPL-87 and four genotypes of horsegram (*Dolichos biflorus*) viz. ACCK - 11, ACCK - 210, ACCK - 292 and DPL - 1 were obtained from the germplasm stock of the Department of Agricultural Botany, College of Agriculture, Dapoli. The grains were cleaned and ground to 60 mesh flour and used for chemical analysis. The crude fibre and ash content were determined by employing the N.I.N., 1977 method[2]. Protein fractions were determined by a modified Mendel Osborne method[3]. Methionine was determined by employing the method[4] and tryptophan by calorimetric method.

Results and Discussion

Proximate composition of different promising genotypes of pigeonpea and horsegram is tabled (Table 1). Moisture content in these genotypes ranged from 6.56 to 8.60, thus showing an overall variation of 2.04 per cent in moisture content. These values indicate that the grains were fairly dried. The protein content showed a wide variation of 6.45 per cent. It ranged from 19.71 in ACCK-210 of horsegram to 26.16 percent in T-21 of pigeonpea. These values were closely related to the protein value already reported [5,6].

All the pigeonpea genotypes had higher content than that of horsegram. The mean ash content of these seven genotypes is almost in a same range of 3.54 and 3.62. The ash content was highest in ACCK-11 of horsegram and lowest in DPL-1 of horsegram.

The fibre content of these various genotypes of two pulses ranged between 3.24 (ACCK-292) to 5.62 (T-21) per cent. Carbohydrates content of these seven genotypes varied from 55.96 to 65.82 having the variation of 9.85 per cent. In general the values for proximate composition were normal and comparable.

The fractionation of pulse, proteins indicated (Table 2) that the globulin was the

predominant fraction and accounted for 55.42 per cent of total protein, while the amount of nutritionally poor-prolamine fraction was found to be the lowest (6.40%). On considering the albumins and glutelins together along with lower proportion of prolamine fraction, AACK-210 and ACCK-11 of horsegram and T-21 of pigeonpea appeared to be superior genotype in their respective groups. On an average , the distribution of albumin, globulin, prolamine and glutein fractions in seven genotypes of two pulses was fairly good. On considering the overall distribution of protein fractions and grain protein content together, T-21 of pigeonpea and ACCK-11 of horsegram were found of be superior to other genotypes in their respective groups. The distribution of protein fraction in pigeonpea was found to be fairly good and agreed well with those reported by Singh *et al*[7].

Horsegram genotypes were having higher tryptophan and methionine content than that of pigeonpea genotypes under study (Table 3). The methionine content varies from 0.76 to 1.63g per 100g grain protein. The methionine content was highest in ACCK-292 of horsegram and lowest in T-21 of pigeonpea. These values of methionine were in fair agreement with those earlier findings[5,8] and the values of methionine content in horsegram were also in accordance with the values reported [9,10].

The tryptophan content of these seven genotypes of two pulses varied from 0.96 to 2.07 being lowest T-21 of pigeonpea and highest in DPL-1 of horsegram. All the horsegram genotypes had fairly high content of tryptophan in their grain protein than the pigeonpea genotypes under study. The values of tryptophan content pigeonpea observed in present study are in fair agreement with those reported by Singh *et al*[7] and Tara and Rama Rao[11]. The Horsegram genotypes had much higher tryptophan content than that of reported by Ray[12] and Manage and Sohonie[10]. The amino acid score revealed that the tryptophan content in horsegram protein was adequate. All the genotypes of horsegram and pigeonpea were deficient in methionine and the deficiency was greater in pigeonpea than in horsegram. The content of methionine and tryptophan in the seven genotypes under study compared well with those reported by Tara and Rama Rao[11] for pigeonpea and Manage and Sohonie[10] for

Table 1. Proximate composition of promising genotypes of pigeonpea and horsegram.

Genotypes	Moisture %	Protein %	Fat %	Ash %	Fiber %	Carbohy-drate %
Pigeonpea ACCT-1	6.56	22.31	1.04	3.63	5.18	61.28
ICPL-87	8.60	22.74	1.41	3.43	5.23	58.59
T-21	7.28	26.16	1.18	3.80	5.62	55.96
Mean	7.48	23.74	1.21	3.62	5.34	58.61
Horsegram ACCK-11	6.56	21.66	0.92	4.06	3.79	63.01
ACCK-210	7.97	19.71	0.48	3.26	3.57	65.01
ACCK-292	7.36	22.09	0.57	3.75	3.24	62.99
DPL-1	6.93	20.14	0.77	3.07	3.27	65.82
Mean	7.20	20.90	0.68	3.54	3.47	64.21

Table 2. Fractional composition of pigeonpea and horsegram genotypes in Konkan.

Genotypes	Protein %	Protein Frations (g/100 g protein)			
		Albumin	Globulin	Prolamine	Glutelin
Pigeonpea ACCT-1	22.31	11.07	51.10	10.30	16.64
ICPL-87	22.74	9.99	59.93	6.55	14.16
T-21	26.16	9.80	54.38	4.05	15.54
Mean	23.74	10.29	55.14	6.97	15.45
Horsegram ACCK-11	21.66	19.58	57.94	4.08	8.16
ACCK-210	19.71	18.83	52.92	4.46	11.66
ACCK-292	22.09	15.08	52.91	6.18	11.96
DPL-1	20.14	16.67	57.91	8.78	10.09
Mean	20.90	17.54	55.42	6.40	10.5

Table 3. Amino acid score of methionine and tryptophan in various pomising genotypes of pigeonpea and horsegram.

Genotypes	Amino acid g/16 g N		Amino acid score	
	Methionine	Tryptophan	Methionine	Tryptophan
Pigeonpea ACCT-1	1.26	1.03	57.00	68.70
ICPL-87	1.01	1.05	29.80	70.00
T-21	0.76	0.96	22.40	64.00
Mean	1.01	1.01	29.70	67.30
Horsegram ACCK-11	1.29	1.83	37.90	122.00
ACCK-210	1.62	1.91	47.60	127.00
ACCK-292	1.63	1.91	47.90	127.00
DPL-1	1.19	2.07	35.00	138.00
Mean	1.43	1.93	42.10	129.00

* Calculated using reference value of 3.4 g/16 g N for methionine and 1.59 / 16 g N for tryptophan (FAO, 1970)

horsegram.

Among the genotypes T-21 of pigeonpea and ACCK-210 of horsegram were found to be nutritionally superior in their respective groups, but their yields were exceptionally low (6.00g/ha for T-21 and 4.22 g/ha for ACCK-210).

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