

Estimation of Nutrient Composition of Different Genotypes of Dolichos Bean (*Lablab purpureus*)

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Abstract

The 14 genotypes of dolichos beans procured were sown in a plot. The harvesting was done after 90—110 days of sowing. The nutrient composition was estimated i.e. the macro nutrient composition, micro nutrient composition and anti-nutrient composition. The results revealed that the genotypes Sel 15-1, HA 4-2, GL 49 and HA 7-7 had higher nutrients with respect to protein, iron, calcium and phosphorous respectively. The genotypes Sel 246, HA 4-1 and Sel 321 had lower anti-nutrient composition for tannin, phytate, and oxalate respectively.

Key words : Nutrient, Anti nutrient, Genotypes, Dolichos beans.

Legumes occupy an important place in human nutrition and serve as a source of dietary protein. Pulses are the natural protein supplements to cereals. Dolichos bean is one of the promising pulses which can be used with other pulses like pigeon pea, mungbean, cowpea, Bengal gram. Pulses are the cheaper sources of protein compared to animal proteins. Dolichos beans (*Lablab purpureus*) commonly referred to as field beans belong to the order Leguminacea. It is originated in India as wild form of the beans. It is a herbaceous perennial herb grown as annual and bushy. The lablab bean is remarkably adaptable. Its various strains thrive under diverse conditions. It is an important multipurpose leguminous crop used as pulse, vegetable and forage. Its dried beans serve as pulse and its tender pod with beans alone serve as vegetable. Field bean is a drought tolerant crop and it is an excellent crop to be grown in dry lands with limited rainfall. In India the average seed yield is about 450 kg/ha (1). It is a field crop mostly confined to the Peninsular India cultivated to a large extent in Karnataka, Tamilnadu and Andhra Pradesh. Karnataka state records production of about 17,046 tones of dolichos bean from an area of 83,225 hectares and productivity being 228 kg per ha (2). The consumption of dolichos beans in India can be popularized by developing varied products. Hence the present investigation was the estimation of nutri-

ent composition of dolichos beans (*Lablab purpureus*).

Methods

The experimental material comprising 14 genotypes of dolichos beans (*Lablab purpureus*) was procured from AICRP on Pigeon pea, UAS, GKVK, Bangalore. The dolichos beans of different genotypes were sown in a plot at Gandhi Krishi Vigyan Kendra (GKVK), Bangalore. After 90—110 days of sowing, the matured pods were harvested and the different genotypes of dolichos beans were estimated for the nutrient composition.

The nutrients analyzed were moisture, energy, protein, fat, carbohydrate, crude fiber, total ash, calcium, iron and phosphorus on dry weight basis. The 14 genotypes of dolichos bean were dried in a hot air oven at 60 C and finely powdered and were subjected for nutrient analysis. The nutrients were analyzed and also the anti nutrients namely phytates, oxalates and tannins were estimated.

The moisture content of the 14 genotypes of dolichos beans were estimated by drying the fresh samples in an oven at 60 C. The dried samples were weighed and this value was subtracted from the fresh weight of the sample to obtain moisture (3). The total protein content of the dried samples was esti-

Table 1. Macronutrient composition of different genotypes of fresh dolichos beans per 100 g. NS : Non-significant.

Genotypes	Moisture (%)	Energy (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Crude fiber (g)
HA 4	9.40	337	27.00	1.45	53.75	4.34
HA 4-1	9.40	342	26.33	1.04	56.75	2.44
HA 4-2	9.42	340	27.26	1.81	53.19	4.26
HA 7-4	9.86	340	26.76	1.19	55.70	2.37
HA 7-6	9.73	344	27.17	0.91	54.88	2.47
HA 7-7	9.73	337	25.72	2.07	54.67	4.41
Sel 10-1	9.11	341	26.34	1.36	55.68	3.36
Sel 15-1	9.20	326	28.44	1.53	50.76	6.53
Sel 23-1	9.59	327	26.14	1.13	53.02	6.14
Sel 246	9.51	325	25.60	1.41	53.36	6.85
Sel 321	9.07	329	27.42	1.56	51.38	6.85
GL 20	9.65	333	25.25	0.91	56.37	4.62
GL 43	9.53	330	25.71	1.12	54.26	4.20
GL 49	9.47	331	26.61	1.07	54.03	5.95
GM	9.48	334	26.58	1.33	54.13	4.53
SE ±	0.04	7.41	0.19	0.08	0.24	0.05
CD at 5%	0.13	NS	0.61	0.25	0.75	0.16

mated as per cent total nitrogen by the micro-Kjeldhal method (3).

Fat was estimated as crude ether extract using moisture free samples. Crude fiber for the sample was analyzed by using moisture and fat free sample (3). The total ash content of sample was obtained by dry ashing of the samples completely by heating it over a flame. Computation of carbohydrate was done by differential method. Energy was calculated as per the

AOAC method.

The mineral solutions of all samples were prepared by dissolving the ash obtained after ashing the samples in a muffle furnace in dilute hydrochloric acid. Now, the calcium was estimated by precipitating it as calcium oxalate and titrating the solution of oxalate in dilute acid against standard potassium permanganate solution.

Determination of phosphorus was carried out

Table 2. Micronutrient composition of different genotypes of dolichos beans (mg per 100 g).

Genotypes	Total ash	Calcium	Iron	Phosphorus
HA 4	4.92	50.98	5.59	427.59
HA 4-1	5.23	56.35	4.85	444.25
HA 4-2	5.09	49.78	6.66	418.67
HA 7-4	5.18	57.82	5.14	437.29
HA 7-6	4.69	53.46	4.97	439.42
HA 7-7	4.62	59.54	6.48	467.64
Sel 10-1	5.25	50.06	6.11	429.53
Sel 15-1	4.83	54.75	5.08	415.35
Sel 23-1	4.77	53.59	5.42	417.24
Sel 246	5.36	52.66	6.17	469.27
Sel 321	4.51	61.34	5.83	453.50
GL 20	4.57	51.76	6.39	471.56
GL 43	5.54	56.55	5.82	457.25
GL 49	4.76	60.28	5.95	451.85
GM	4.95	54.92	5.75	442.88
SE ±	0.23	2.99	0.35	13.01
CD at 5%	0.684	8.69	1.03	37.85

Table 3. Anti-nutrient composition of different genotypes of dolichos beans (mg/100 g).

Genotypes	Tannins	Phytate	Oxalate
HA 4	691.23	695.98	357.30
HA 4-1	658.98	652.35	470.40
HA 4-2	709.23	736.23	387.90
HA 7-4	736.54	708.05	396.48
HA 7-6	595.02	661.23	331.90
HA 7-7	634.59	725.24	433.30
Sel 10-1	582.31	713.26	350.60
Sel 15-1	749.29	670.05	343.50
Sel 23-1	612.11	687.68	365.20
Sel 246	579.92	748.07	440.00
Sel 321	600.95	668.39	316.90
GL 20	588.21	691.51	392.90
GL 43	605.92	672.54	516.00
GL 49	680.09	701.99	408.10
GM	428.96	695.18	393.56
SE ±	19.86	7.39	1.04
CD at 5%	57.77	21.50	3.18

by measuring colorimetrically the blue color formed when the ash solution is treated with ammonium molybdate and thus phosphomolybdate formed is reduced. Iron was determined colorimetrically and the ferric iron gives a blood red color with potassium thiocyanate.

The estimation of phytic acid was based on the principle that the phytate is extracted with trichloro acetic acid and precipitated as ferric salt. The principle involved in the estimation of oxalic acid, is extraction of oxalic acid from food stuff and precipitation as calcium oxalate which is then titrated against standard potassium permanganate. Tannins was estimated by colorimetric method based on the measurement of blue color formed by the reduction of phosphotungsto molybdic acid by tannin like compounds in alkaline solution. The nutrient composition of the genotypes were analyzed using analysis of variance. All the genotypes were suspected to *F* test and *t* test at five per cent significance.

Results and Discussion

The nutrient composition of different genotypes of dolichos beans were estimated on dry matter basis and were computed for fresh matter basis. Macronutrients such as moisture, energy, protein, fat, carbohydrate and crude fiber were estimated. The results are presented in Table 1.

The moisture percentage varied between 9.07—9.86%. The genotype HA 7-4 had significantly higher moisture content of 9.86% followed by HA 7-6 and HA 7-7 (9.73 per cent), GL20 (9.65%) and Sel 23-1 (9.59 per cent). Similar observations were made by Arora and Begum (4) evaluated 12 rice bean varieties for nutritional quality and reported that the rice bean varieties showed a mean value of 10.80% moisture.

The energy content was observed highest in genotype HA 7-6 (344 k cal) and the least energy value in the genotype Sel 246 (325 k cal). The result exhibited non-significant difference among the genotypes. The average protein values ranged from 25.25—28.84 g with a mean value of 26.58 g. The protein value was recorded highest in the genotype Sel 15-1 (27.84 g). Similar estimations of crude protein was made by Maciejewicz et al. (5) studied on beans of nine polished cultivars of field bean and reported that the crude protein range being 26.80 to 31.20%.

The fat content ranged from 0.91—2.07 g with a mean value of 1.33 g. The fat content was recorded highest in the genotype HA 7-7 (2.07 g) and the least fat content was observed in the genotype GL 20 and HA 7-6 (0.91 g). Statistically significant difference existed among the genotype.

The carbohydrate content of dolichos beans was estimated to be 50.76—56.75 g. The carbohydrate content was observed highest in the genotype HA 4-1 (56.75 g) followed by GL 20 (56.37 g) and HA 7-4 (55.70 g).

The crude fiber content of the samples ranged from 2.37—6.85 g. The highest crude fiber content was noticed in Sel 246 (6.85 g).

The micronutrients such as total ash, calcium, iron and phosphorus were estimated for all the genotypes of dolichos beans. The values are represented in the Table 2. The total ash content of the dolichos beans ranged from 4.62—5.54 g with a mean score of 4.95 g. The ash content was observed highest in the genotype GL 43 (5.53 g) and the least was noticed in the genotype HA 7-7 (4.62 g). Calcium was observed highest in the genotype Sel 321 (61.34 mg) followed by GL49 (60.28 mg) and HA 7-7 (59.54 mg). Similarly Chetia et al. (6) studied the composition of five dolichos bean cultivars and noted that the amounts of calcium varied from 2—48 mg per 100 g.

The iron content of the dolichos beans varied from 6.66 to 4.85 mg with a mean value of 5.75 mg. The genotype HA 4-2 had the highest iron content of 6.66 mg and the least was noticed in HA 4-1 (4.85 mg). The phosphorus content ranged from 415.35—471.56 mg with a mean score of 442.88 mg. The highest phosphorus content was observed in the genotype GL 20 (471.56 mg) followed by Sel 246 (469.27 mg) and HA 7-7 (467.64 mg). The anti nutrient composition of different genotypes of dolichos beans were estimated by AOAC and NIN methods. The values are represented in the Table 3. Tannin content was found to be highest in Sel 15-1 (503.80 mg) followed by HA 7-1 (497.30 mg) and the least was in Sel 246 (334.6 mg). These differences may be due to genetic factors. The highest phytate value was noticed in the genotype Sel 246 (748.07 mg) and the least phytate content in HA 4-1 (652.35 mg). The statistically non-significant differences existed among the genotypes with regard to phytate content. The genotype Sel 321 (316.90 mg) had the least oxalate content followed by

HA 7-6 (331.90 mg) and Sel 15-1 (343.5 mg). Lower the anti-nutrient content better will be the absorption of micronutrients especially calcium and iron. Hence dolichos bean genotypes Sel 246, HA 7-6 and Sel 321 can be used for regular consumption.

Thus can be concluded that dolichos lablab beans is the cheaper source of micronutrients, protein and crude fiber compared to other beans. Hence dolichos beans could be easily affordable by the low income group.

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