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Cooking Quality of Some Improved Varieties of Greengram Dhal

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The chemical composition, cooking and organoleptic qualities and physical characteristics of three commercially important varieties of greengram (CO.1, CO.2 and CO.3) have been determined and were compared with a mutant strain M2. CO.1 and CO.2 were found to get cooked in shorter time. Protein content appeared to be more in M.2 and there was no difference in the rest of the proximate principles. All the varieties tested registered an increase of 300 - 500 per cent in cooked volume. There was no significant difference between the varieties for smell and under over-all preference test, CO.1 scored maximum ranking followed by M.2, CO.3 and CO.2. Vareity M.2 had seeds of bigger size and had a higher grain weight.

Proteins form an essential component in human diet. It has been well recognised that protein deficiency in the diet particularly of young children is one of the major nutritional problems of India and other developing countries. Some of the important sources of proteins are from pulses, oil seeds and from animals. Throughout our country, pulses are used in various side dishes and they contribute to a large bulk of our daily protein requirements. Being rich in lysine, they have a very high supplementary value to cereal based diets.

Greengram (*Phaseolus aureus* Roxb.) is an important pulse crop grown in Tamil Nadu under large acrage with an annual production of 38,190 tonnes (Anon., 1976). For greengram, CO.1, CO.2 and CO.3 are the important varieties grown besides the local varieties. Recently, Tamil Nadu Agricultural University has evolved a new strain, M2 from CO.1 through gamma irradiation. This has recorded a mean yield of 1000 kg per hectare representing an increased yield of 26 per cent over CO.1 (Annappan, 1976). These varieties were chemically analysed for their nutritive value and have been compared for their cooking and organoleptic qualities. Their physical characteristics have also been evaluated and presented in this paper.

MATERIALS AND METHODS

The unsplit whole greengram was used to determine physical characteristics by the procedure of Battacharya *et al*. (1972). The dehusked split dhal was used in the further studies. Proximate composition was obtained from the finely ground whole flour obtained

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from dhal. Moisture was determined by drying at 110° C for 18 hours. Nitrogen and ash, were determined by the AOAC methods (1955). Total and reducing sugars were determined by the method of Somogyi (1945). Fat was estimated by extraction with petroleum ether (60 - 80° C) for 12 hours. Cooking time was determined by cooking 5 g. of the dhal with 20 ml of water in a test tube on a boiling water bath until the grains were cooked. Water absorption, volume of cooked dhal and solids lost in cooking water were determined by cooking 5 g. of the dhal with excess water (35 ml) in test tubes on a boiling water bath for the amount of cooking time already determined. The excess water was decanted, filtered and made up to 100 ml to determine the dissolved solids. The volume of the dhal occupied in the test tube was then noted and any adhering water was removed by gently blotting with filter paper and the weight increase was determined. From these, the volume increase during cooking and the amount of water absorbed were calculated. For cooking in pressure cooker, cooking was conducted independantly for different length of time and the period after the pressure reached 15 psi was noted. Taste panel evaluation on the cooked dhal was conducted with untrained judges who evaluated the varieties for colour, flavour and taste on a hedonic scale of 1 to 10.

RESULTS AND DISCUSSION

The chemical composition of the different varieties tested is given in Table I. Protein content appears to be higher in M2 than in the other varieties. There is not much difference in the rest of the proximate principles among the varieties. Total protein in greengram has been found to range between 24.5 and 31.2 per cent (Gopalan *et al.* 1971, Hymowitz *et al.* 1975), and the present values agree fairly well with them.

The cooking characteristics of the dhals are given in Table II. Time required for cooking the pulses is an important quality index used by the housewives for judging the dhals.

TABLE I. Proximate Composition of green gram verieties

Variety	Calculated on dry basis						
	Moisture (%)	Protein (%)	Fat (%)	Ash (%)	Carbo-hydrates (%)	Total sugars (%)	Reducing sugars (%)
CO 1	8.36	27.28	0.91	3.32	60.13	1.62	0.41
CO 2	7.72	26.08	0.96	3.38	61.86	2.86	0.33
CO 3	7.94	26.81	0.90	3.26	61.09	3.01	0.24
M 2	8.03	28.88	0.91	3.41	58.77	3.01	0.55

TABLE II. Cooking quality of the green gram varieties

Variety	Cooking time (Min)		Water absorption (ml/100 gm)	Vol. of cooked dhal (ml)	Solids extracted in cooking water g/100 ml
	Open vessel	Pressure cooker			
CO 1	24	3	160	29	1.88
CO 2	35	4	175	27	2.32
CO 3	22	3	180	27	1.83
M 2	30	3	158	23	1.89

Naturally she prefers the dhal which takes the minimum time to cook. In this characteristics, CO.1 and CO 3 are cooked in much less time than CO.2 and M2. Under pressure cooking also CO.2 appears to take more time.

Rasam is an important side dish in all the South Indian dietary. For this, invariably the water extract of the dhal is used (Rama Rao and Kadkol, 1957). The organoleptic evaluation scores of the pulses are given in Table III. It is

TABLE III. Taste Panel evaluation scores of different varieties of green gram

Variety	Colour	Taste	Aroma	Over-all Preference (No. of persons)
CO 1	73*	75*	72*	12
CO 2	39	39	51	3
CO 3	18	42	55	5
M 2	66*	63*	54	6

* Significant at P 0.5% interval

found that there is significant difference ($P < 1\%$) in the varieties for taste and colour only and with regard to smell there is no difference. This is understandable because the greengram dhal does not have a profound smell. Under preference test, CO.1 had scored the maximum ranking followed by M2. The taste of the cooked dhal did not correlate with the content of the total and reducing sugars present. The range of total sugars and monosaccharides has been reported as 2 69 to 5.88 per cent and 0.38 - 1.00 per cent respectively (Rama Rao and KadKol, 1957). These values are found to be somewhat low in the present investigation. The cooked dhal often had a 200 per cent increase in volume (Shivashankar *et al.* 1974). The increase recorded here ranged from 300 - 500 per cent.

The physical characteristics of the different varieties are shown in Table IV. The variety, M2 has a bigger

TABLE IV. Physical characteristics of green gram varieties

Variety	100 seed wt. (gm)	Specific gravity	Bulk density (gm/ml)
CO 1	3.58	1.40	0.91
CO 2	3.31	1.42	0.86
CO 3	3.12	1.42	0.83
M 2	4.18	1.39	0.83

sized and heavier seeds. There was not much difference in the specific gravity and bulk density between varieties tested. Total water soluble solids remained the same for all varieties and

no significant differences could be found for this characteristic between varieties under identical conditions.

In conclusion, it was found that the variety CO.1 peformed better in cooking and organoleptic characteristics than others. Under over all preference, variety M2 faired better than CO2 and CO3, and its seeds were bigger, and heavier than that of others.

REFERENCES

ANNAPPAN, R. S. 1976. Personal communication.

ASSOCIATION OF OFFICIAL ANALYTICAL CHEMISTS. 1955. *Official methods of analysis, eighth edition.* 12 : 371-74, 535.

BHATTACHARYA, K. R., C. M. SOWBHAGYA and Y. M. INDUDHARASWAMY. 1972. Some physical properties of paddy and rice and their interrelations. *J. Sci. Fd. Agric.* 23 : 173.

DIRECTOR OF STATISTICS. 1976. Tamil Nadu first and final estimate of greengram. Dept. of Statistics, Madras.

GOPALAN, C., B. V. RAMA SASTRI and S. C. BALASUBRAMANIAN. 1971. *Nutritive value of Indian foods.* National Institute of Nutrition. Indian Council of Medical Research, Hyderabad.

HYMOWITZ, T., F. I. COLLINS and J. M. POCHIMAN. 1975. Relationship between the content of oil, proteins and sugar in mung bean seed. *Trop. Agr.* 52 : 47-51.

RAMA RAO, G., and S. B. KADKOL. 1957. Water extractible N in Indian pulses. *Fd. Sci.* 154.

SIVASHANKAR, G., B. R. RAJENDRA, S. VIJAYAKUMAR and R. SREEKANTARADYA. 1974. Variability for cooking characteristics in a collection of greengram (*Phaseolus aureus* Roxb). *J. Fd. Sci. Tech.,* (Ind). 11 : 232.

SOMOGYI, M. 1945. A new reagent for the determination of sugar. *J. Bio. Chem.* 160 : 61.