Iran. J. Agric. Res. Vol. 3, No. 2, 1975

CHEMICAL COMPOSITION OF SESAME VARIETIES OF MADHYA PRADESH, INDIA[1]

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ABSTRACT

A study on chemical composition of 18 sesame (*Sesamum indicum* L.) varieties showed that the variety N65-102 had the highest protein and methionine contents. There was a significant negative correlation between protein and methionine contents. The highest oil content of 53.98% was found to be in variety N66-276. No relationship between oil content and iodine value, free fatty acid and carbohydrate content was found.

INTRODUCTION

Because of its high oil content with multifarious utility, sesame (*Sesamum indicum* L.) is one of the important oil seed crops in many countries. Further it has fairly high level of protein of high nutritive value (6). Although recent studies by Dhawan *et al.* (2) were directed towards certain characterstics of oil from different varieties, no efforts have so far been made for the improvement of protein quality. Protein meal from sesame is reported to be rich in methionine and is important in terms of its supplementary value in deficient diets.

In India, Madhya Pradesh ranks third in sesame production. The present study was undertaken to find the variation in protein and methionine contents of sesame meal flour from different varieties in this area. Oil content and its important characteristics were also studied.

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MATERIALS AND METHODS

Eighteen varieties of sesame grown at Jabalpur under All India Coordinated Project on Oilseeds during the year 1971 were selected for the study. These were grown at one location in a randomized block design in four replications. The plot size was 9 x 1.5 m. Fertilizer doses given were 30 kg N, 20 kg P_2O_5 and 20 kg K_2O per ha. No irrigation was provided since planting was done in rainy season. The composite samples obtained from the above experiment were used for the analyses of protein, methionine, oil, free fatty acid, iodine value, refractive index, ash content and carbohydrate.

Protein: A o.5 g of the sesame sample was analysed in duplicate for protein content by standard microkjeldahl procedure and the factor 6.25 was used for conversion of N to protein.

Methionine: A 2 g of defatted sesame flour sample in duplicate was hydrolyzed with 50 ml of 3N HCl by refluxing for 18 hr. The hydrolyzate was treated with activated charcoal, filtered and methionine was estimated according to the procedure outlined by McCarthy and Sulivan (5).

Oil Content: A 2 g of the samples in duplicate was powdered with the aid of anhydrous sodium sulphate and extracted in Soxhlet extraction apparatus for 8 hr with petroleum ether as solvent. Total carbohydrate, ash content, iodine value, refractive index at 25 C by Abbe refractometer and free fatty acid in duplicate for each sample was estimated by procedures described by the A.O.A.C. (1).

RESULTS AND DISCUSSION

Data given in Table 1 showed significant varietal differences in respect to protein and methionine contents, with the range of 20.25% (N 62-7) to 23.7% (N 66-235) for protein and 1.74% (N 66-235) to 4.02% (N 65-102) for methionine content of proteins. A significant negative correlation (-0.344) was found between protein and methionine contents. A similar relationship has been reported earlier in case of triticale for protein and lysine content (7) and in case of mungbean for protein, methionine and tryptophan contents (3).

The methionine content observed in the present study compared well with those

Table 1. Protein, methionine, total carbohydrate and total ash content in sesame varieties.

Variety	Protein, %	Methionine, g/100 g protein	Total carbohydrate, %	Total ash, %
N66-18	22.88	2.408	16.65	5.116
N66-276	22.47	2.440	14.40	4.080
No. 128	21.65	3.543	18.72	5.547
No. 270	21.74	2.330	18.00	6.139
N65-19	22.30	3.062	20.25	4.806
N66-130	20.28	3.898	18.09	5.893
N62-36	21.34	2.092	15.75	5.454
L 80	23.23	1.867	21.15	5.891
No. 28	21.14	3.240	21.15	4.524
N62-16	21.19	3.119	22.05	5.650
N66-255	21.45	2.945	21.60	6.139
N-20	22.52	2.440	20.25	6.471
N62-7	20.25	2.468	25.20	5.458
N66-235	23.71	1.745	23.85	4.747
N62-4	20.35	2.445	22.50	6.013
N65-102	23.23	4.022	22.05	3.794
N62-14	22.56	2.260	24.30	5.685
N62-32	21.21	3.767	22.95	5.981
Mean	21.86	2.78	20.49	5.52
Standard error	.230	.039	3.015	.636
Coefficient of variability, %	1.49	2.40	14.71	11.51

Table 2. Varietal differences in some important quality characters of sesame oil.

Variety	Oil content, %	Iodine value, % iodine absorbed per g of oil.	Free fatty acid expressed as oleic acid, %	Refractive index at 25 C
N 66-18	51.66	105	3.454	1.455
N66-276	53.98	113	1.828	1.454
No. 128	53.87	103	3.018	1.454
No. 270	51.18	107	3.593	1.455
N65-19	50.75	109	3.003	1.456
N66-130	50.24	110	1.825	1.455
N62-35	53.92	106	2.220	1.454
L-80	51.13	109	1.552	1.455
No. 18	51.65	106	2.478	1.455
N62-16	52.79	108	3.373	1.455
N66-255	49.42	108	2.679	1.455
N-20	52.19	108	2.256	1.454
N62-7	52.89	107	2.303	1.454
N66-235	53.52	111	1.578	1.455
N62-4	50.73	105	2.574	1.455
N65-102	51.70	114	3.441	1.455
N62-14	52.42	108	2.966	1.454
N62-32	52.37	112	3.443	1.455
Mean	52.02	108.28	2.66	1.46
Standard error	1.325	2.906	.675	.002
Coefficient of variability, %	2.55	2.68	25.37	0.16

reported earlier (4) except for the values obtained for certain varieties like N66-235 and N62-36. Other varieties like N62-32, N65-102 and N66-130 with higher values of methionine could be recommended as better supplementary agents in methionine deficient diets. These varieties had the yield potentials ranging from 252 to 372 kg per ha which was comparable with the yields ranging from 187.6 to 392 kg per ha for low methionine varieties stated earlier.

Oil content varied between 49.42 (N66-255) to 53.98% (N66-276) as shown in Table 2. No relationships were apparent between oil content and the iodine value, a measure of total degree of unsaturation. This was in agreement with the observation made by Dhawan *et al.* (2). Free fatty acid level expressed as oleic acid value, which is an indication of rancidity as a result of lipolysis, ranged between 1.552 to 3.456%. Thus varieties such as L-80, N66-130 and N66-235 with lower acid values would have a better keeping quality. Variety N-128 has also been singled out in earlier studies because of high acid value (2). Similar observation has been made for this variety in the present study.

There was no correlation between oil content and iodine value, oil content and free fatty acids, oil and carbohydrate and protein and carbohydrate. Further no significant correlation was found for refractive index and iodine value. Considerable variation was observed in the total ash content.

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