

Study of biochemical parameters in soybean [*Glycine max* (L.) Merrill] genotype

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SUMMARY

An experiment was conducted in *kharif* 2001 consisting of six genotype viz., JS-71-05, Kuber, Chaturbhuj Indira Soya-9, JS-335 and MACS-124 to study biochemical parameter viz., chlorophyll, oil, and protein content in soybean. The genotype Kuber exhibited higher chlorophyll 'a', chlorophyll 'b' and total chlorophyll content in leaf at 50 per cent flowering stage of crop. The JS -335 exhibited highest oil and protein content followed by genotype Kuber.

Key words : Biochemical, Chlorophyll, Oil, Protein, Soybean

Soybean [*Glycine max* (L.) Merrill] is recognized as one of the premier agricultural crop, which has revolutionized the agricultural economy with its immense potential for food, fuel and industrial products. It owes world wise reputations by virtue of its well-balanced contents *i.e.* 19-20 per cent oil, 40-42 per cent protein, 20-30 per cent carbohydrates, vitamins and other essential amino acid. Soybean ranks first in world among the oilseeds with an annual production of 105 million tones. In India, it occupies third place in oilseed scenario. As an effort in this direction, the present investigation was undertaken to study the biochemical parameters of various soybean genotype.

MATERIALS AND METHODS

The present investigation was carried out at Instructional Farm, Indira Gandhi Agricultural University, Raipur during *kharif* of 2001. The experiment was laid out in Randomized Block Design with three replications and six genotypes viz., JS-71-05, Kuber, Chaturbhuj, Indira Soya - 9, JS - 335 and MACS - 124.

Chlorophyll content (mg/g):

Extraction of pigment was done in DMSO (Dimethyl sulphoxide) according to method of Hiscox and Israelstan (1979) and the amount of chlorophyll 'a'; 'b' and total chlorophyll were calculated using Arnon (1949) formula.

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$$\text{Total chlorophyll content (mg/g)} = \frac{\text{OD } 652 \times 1000}{345} \times \frac{V}{1000 \times W}$$

$$\text{Chlorophyll 'a' (mg/g)} = 12.7 (\text{OD } 663) - 2.69 (\text{CD } 645) \times \frac{V}{1000 \times W}$$

$$\text{Chlorophyll 'b' (mg/g)} = 22.9 (\text{OD } 645) - 2.69 (\text{CD } 643) \times \frac{V}{1000 \times W}$$

where,

OD = Optical Density

V = Volume of DMSO solution (10ml)

W = Fresh weight of sample taken (g)

Oil content:

Oil content was determined by Soxhlet oil extraction method and was calculated by following formula

$$\text{Oil in granted sample (\%)} = \frac{\text{Weight of oil (g)}}{\text{Weight of sample}} \times 100$$

Protein content:

Protein content was determined by Microkjeldahls procedure (Jackson, 1967)

RESULTS AND DISCUSSION

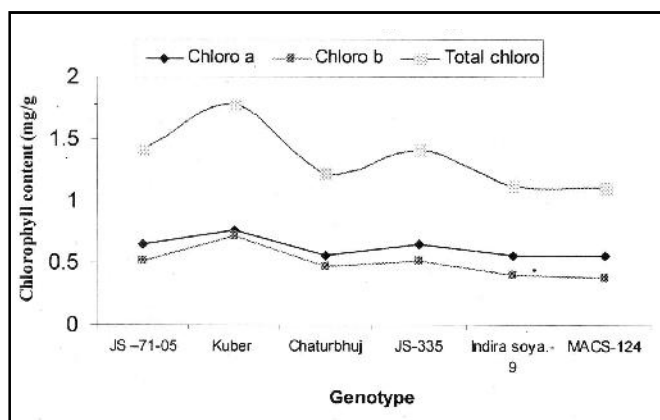
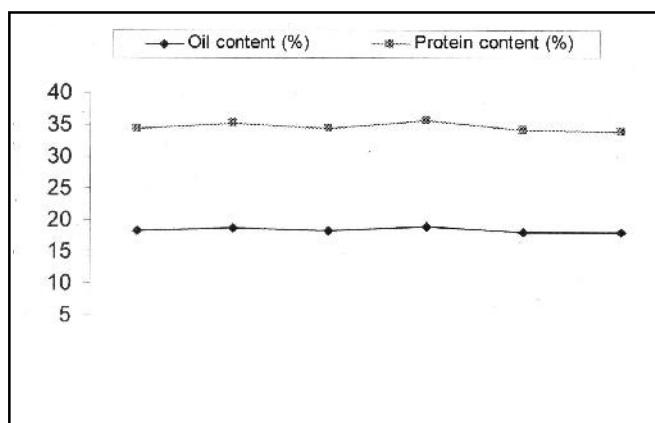
All the genotype differed significantly in chlorophyll 'a', chlorophyll 'b' and total chlorophyll at 50 per cent flowering stage of crop. The data on content of chlorophyll 'a', chlorophyll 'b' and total chlorophyll are presented in Table 1 and illustrated in Fig. 1. The genotype Kuber showed significant superiority over all the other genotypes in chlorophyll 'a' chlorophyll 'b' and total chlorophyll content, which was followed by JS-71-05. Minimum amount of chlorophyll 'a', chlorophyll 'b' total chlorophyll was found in genotype MACS-124 as compared to other genotypes. With respect to leaf chlorophyll content, the genotype Kuber possessed maximum chlorophyll 'a', chlorophyll 'b' and total chlorophyll. The genotypic

Table 1 : Chlorophyll content (mg/g) of soybean genotype of 50 % flowering stage

Genotype	At 50 % flowering stage		
	Chlorophyll a	Chlorophyll b	Total chlorophyll
JS -71-05	0.647	0.515	1.413
Kuber	0.765	0.717	1.776
Chaturbhuj	0.563	0.473	1.223
JS-335	0.643	0.509	1.410
Indira soya-9	0.561	0.399	1.113
MACS-124	0.555	0.377	1.108
S.E. \pm	0.0013	0.0018	0.0017
C.D. (P=0.05)	0.004	0.0056	0.0053

Table 2 : Oil and protein content (%) of soybean genotype

Genotype	Oil content (%)	Protein content (%)
JS -71-05	18.19	34.35
Kuber	18.62	35.17
Chaturbhuj	18.19	34.34
JS-335	18.83	35.55
Indira soya-9	18.06	34.22
MACS-124	18.00	33.98
S.E. \pm	0.342	0.0854
C.D. (P=0.05)	0.107	0.269

**Fig. 1 : Chlorophyll content of soybean at 50% flowering stage****Fig. 2 : Oil and protein content of soybean genotypes**

differences in chlorophyll content were also reported by Patel *et al.* (1998) in soybean.

The data on oil content is presented in Table 2 and illustrated in Fig. 2 indicated that the significant differences existed in all of the genotypes. The genotype JS-335 exhibited highest value of oil content in seed (18.83%) while, minimum value was noticed in genotype MACS - 124 (18.00%). The data on protein content is presented in Table 2 and illustrated in Fig.2. The genotypes in JS-335 showed significant superiority over all other genotypes in protein content, which was followed by genotype Kuber

while, minimum protein content of seed was obtained in genotype MACS 124. The genotype JS-335 possessed maximum oil and protein content with respect to all other-genotypes, which might be due to better partitioning at nitrogen into the sink. The genotypic differences in oil and protein content were also reported by Saxena and Pandey (1970) Bengal and Gupta (1998) soybean.

From above study it may be concluded that the genotype Kuber exhibited higher chlorophyll 'a', chlorophyll 'b' and total chlorophyll in leaf at 50 per cent flowering stage of the crop, while the genotype JS-335 showed higher oil and protein content.

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