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Sodium Azide Induces Protein Content of Soybean Cultivar JS-335 (Glycine max. L.)

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ABSTRACT
Soybean is vital source of protein, and preserving its protein content is crucial. Sodium azide is chemical compound that inhibit the protein degradation. This study investigates that effect of sodium azides on protein content in soybean. Our result shows that sodium azide increases protein content in soybean concentration dependence manner. In the present investigation, attempts were made to induce genetic variability of Protein in soybean cultivars (*Glycine. max*. L) JS-335 by employing chemical (Sodium azide) Mutagens. Sodium azide shows Protein content induces as compared to control cultivar. In these cultivars increasing content of Protein was observed. According to our result high content of protein was observed at 20 mM of Sodium azide.

Keywords: Mutagenic Sensitivity, Soybean, Sodium azide, Mutation.

INTRODOCTON

Soybean is significant source of protein and its protein content is essential for human nutrition. Sodium azide is widely used preservative that that inhibit protein degradation this study aims to investigate the effect of sodium azide on protein content in soybean. Soybean (*Glycine max.*L) is one of the economically important grain legumes grown in world which gave good amount of profit to the farmer. Soybean were developed mainly two main products of the with about seed oil and protein content. On an average dry matter basis soybean content about 40 protein and 20% oil. It belongs to family Fabaceae. Soybean originated in China and is being cultivated there for more than 4000 years (Hymowitz, 1970). Soybean has new become the largest source of vegetable oil and protein in the world and about 95% of the world's annual soybean production is from major countries like USA, Brazil, Argentina, China and India. In the present program therefore, undertaken to genetic variability and to screen useful mutants for their use in improvement of soybean. Genetic differences exist in the response of plant to different chemical mutagens such as sodium azide. Sodium azide differs in their relative capacity to induced mutation in soybean plants.

MATERIALS AND METHODS

Seeds of soybean cultivar, JS-335 used in the present investigation were procured from Mahatma Phule Krishi Vidyapeeth, Rahuri (Maharashtra) this cultivars are widely cultivated in Maharashtra. To begin with pilot experiments were conducted to determine the lethal dose (LD_{50}), suitable concentration of the mutagens and duration of treatment for both the cultivars of soybean. This variety of soybean was treated with Sodium azide chemical mutagen. from such experiments it was finally established that concentration of 0.05mM, 10, 15 and 20 mM for duration of 12 hrs and 18 hrs hours are best suitable for mutagenic treatments for the cultivar of soybean for chemical mutagen treatments, seeds were presoaked in distilled water for 6 hours and subjected to freshly prepared mutagen solutions for 12 hrs and 18 hrs at 25± 2^0C with intermediate shaking. The volume of mutagenic solutions was about 5 times to that of seeds. The seeds, treated with chemical mutagens were thoroughly washed under running tap water for an hour to terminate the reaction of the chemical.

Protein content- Two seeds from the same plant of each M_1, M_2, and M_3 plants were separately hulled and grinded in mortar and extracts were defatted by washing with three changes of cold acetone for 4-6 hrs. The acetone was removed by filtration and extract were air dried a room temperature. The protein from the defatted meal were precipitated with 10% trichloroacetic acid and recovered by centrifugation at 50000 rpm.for 30 min at 40^0C.The protein content was then determine calorimetrically according to method of Lowey. et al (1951) using bovine serum albumin as standard.

RESULTS AND DISCUSSION

In the present investigation total protein contents were observed in total mutant wise high mean values for among the dose/concentrations of all mutagenic treatments. (Table 1).

Treatments	**M_1**	**M_2**	**M_3**
Control	38.39+0.22	38.96+1.25	39.19+1.10
SA-0.5%	37.97+0.18	38.96+ 0.28	37.22+0.30
10%	35.13+0.33	35.64+0.17	36.33+0.
15%	38.56+0.11	37.88+0.33	37.42+0.29
20%	39.64+0.25	40.19+0.88	41.22+0.13

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Such observation was reported by some previous workers in soybean, Gamma rays induced high protein content in, soybean cultivars (*Glycine. max*. L) JS-335 Enken, V. B. and Bazavluk, I. M.1971,Hiraiwa, S., Nkamara, S. and Tanaka, S. 1975, McKendry, A. L, McVetty, P.B.E. and Voldeng, H.D. 1985, Sabbouch, M.Y. 1987,Sapra, V. T., Asghar, A., Chawan, C. B. and Wang Zang, K. 1994, Sichkar, V. L., Leritsky, A. P. and Marjushkin, V. F. 1982,Smutkupt, S. 1976a, Williams, J. H. and Hanway, D. G. 1961, Zhang, J.Z. Wang, P.Y.1994, Akilov, U. A. 1975.But Arulballachandan and Mullainathan, 2009 showed Changes of protein methionine content of black gram *(Vegnamungo(L)* Hepper) . Induced by gamma rays and EMS. Similar observations were made other plants like a chick pea (Abo-Hegazi,1980), reported the high yielding mutation with high protein content of superior quality of F2 generation with gamma irradiated and EMS treated plants, but Bhatnagar, P. S. Tiwari, S. P. & Singh, C. 1992. Bhatnagar, P. S., Tiwari, S. P. and Singh. C. 1992b reported disrupting the negative association between oil and protein content in soybean seeds through mutagenesis. In our experiments more amount of protein was reported in chemical mutagen Sodium azide treatments than the control In general both the positive and negative shift was observed in most of mutagenic treatments. The highest protein content was observed 20% in chemical mutagen Sodium azide treatments.

CONCLUSION

In conclusion our study demonstrates that sodium azide increases protein content in soybean cultivars (*Glycine. max*. L) JS-335. These finding have implication for the preservation of protein content in soybean and other legumes plants.

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