To Study Antioxidant Property of *Glycine max (Soya)*

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Abstract - Antioxidants prevent oxidation from free radicals thereby increasing the life of oxidizable materials. Mostly from fresh fruits and vegetables we get antioxidants which prevent the oxidation of molecules in whole body. Antioxidants play a vital role in cosmetics these days, because everyone wants to look young with beautiful and glowing skin. Cosmeceuticals are the cosmetic products which consist of biologically active ingredients which claim for medicinal and therapeutic activity including anti aging effects (1). Present work is carried out to study the antioxidant activity of Glycine max (Soya) belonging to family Fabaceae. Soyabeans were extracted with methanol using Soxhlation and various tests were carried out to study the antioxidant properties. Phtochemical analysis and Hydrogen peroxide scavenging assay method were performed, and by the results it was concluded that Soya consists of flavonoids and possesses good antioxidant properties.

Keywords: Aging, Cosmeceutical, Antioxidant, Flavonoid, Scavenging activity.

I. INTRODUCTION

Aging of the skin is influenced by different factors like heavy alcohol consumption, pollution, lifestyle, lack of sleep, exposure to ultraviolet light. All these factors lead to deterioration in look of skin as well as its mechanism. (2) Various signs of aging includes wrinkles, fine lines, dryness, loss of elasticity, pigmentation spots. Popularity of topical application of natural antioxidants is increasing day by day. (3)

Glycine max (Soya) is a legume which is consumed for its benefits in the whole world. It is a complex food consisting of 20% oil and 40% protein. It also consists of bioactive compounds like isoflavones, saponins, lunasin, trypsin inhibitors. Out of total phenol, 72% of isoflavones are present in soya. Total phenolic content is an essential component of antioxidant activity of soyabeans. Diadzein and Genistein are the two very important isoflavones present in soya. (4)

These bioactives have wide applications in cosmetics to treat wrinkles, fine lines and different signs of aging.

II. MATERIALS AND METHODS

The material (Soyabean) was procured from local suppliers and authenticated from Department of Botany, Campus, RTM Nagpur University.

- EXTRACTION: (SOXHLET)

The drug was ground and placed in thimble chamber of Sohxlet apparatus.The solvent used for extraction was Methanol. It was heated till its vapours condense in condenser. Temperature was maintained at 80^0C. This set was kept for 3 Days for 8 hours to complete the extraction. The extract was evaporated to obtain a constant weight and yield. % yield of soya was found to be 7.29 %.

Figure no.1: Extraction of Soyabean

- PHYTOCHEMICAL SCREENING [5]

Various qualitative tests were carried out to detect chemical composition of extract.

Table no.1: Phytochemical screening of Glycine max (Soya)

Secondary Metabolites	Name of test	Soyabean Methanolic extract
Flavonoids	Alkaline reagent test	+
Alkaloids	Mayer's test	+
	Dragendorff's Test	
Carbohydrate	Molish's Test	-
	Benedict's Test	
Glycosides	Keller Killiani test	-
Saponins	Foam Test	-
Proteins and Amino acids	Biuret test	+
Phenols and Tannins	Ferric chloride test	+
Phytosterols	Salkowaski test	-

Extract showed the presence of Flavonoids, alkaloids, proteins and amino acids, phenols and tannins.

- HYDROGEN PEROXIDE (H_2O_2) SCAVENGING ASSAY

The ability of the sample to scavenge hydrogen peroxide was determined according to the following method [6]

Reagents:

1. 0.1M Phosphate buffer ($Na_2 HPO_4$)
2. 4mM H_2O_2
3. Standard ascorbic acid

Procedure:

- Stock solution of Standard Ascorbic acid: 1mg of ascorbic acid was dissolved in 1ml of distilled water.
- Working solution: 5, 10, 15, 20, 25µl of the standard ascorbic acid solution were taken from the stock solution and the volume made up to 1ml with distilled water to obtain the final concentration of 5-25µg/ml.
- 2 ml of plant extract solution were made of by taking six different concentrations ranging from 10 to 250µg/ml.
- 0.3ml of 4mm H_2O_2 solution prepared in phosphate buffer (0.1 M pH 7.4) was mixed with plant extract solution and incubates for 10 minutes.
- The absorbance of the solution was taken at 230 nm against blank solution containing the plant extract without H_2O_2.
- The percent inhibition was calculated using the formula:

$$\text{Inhibition (\%)} = \frac{\text{(Abs of Control – Abs of test)}}{\text{Abs of Control}} \times 100$$

Table no.2 : H2O2 Assay of Ascorbic acid

Concen-trations	Without H_2O_2	With 40mM H_2O_2	Difference	Percentage activity
10	0.016	1.699	1.683	32.680
20	0.183	1.435	1.252	49.920
30	0.268	1.303	1.035	58.600
40	0.386	1.190	0.804	67.840
50	0.429	1.088	0.659	73.640
100	0.607	0.777	0.170	93.200

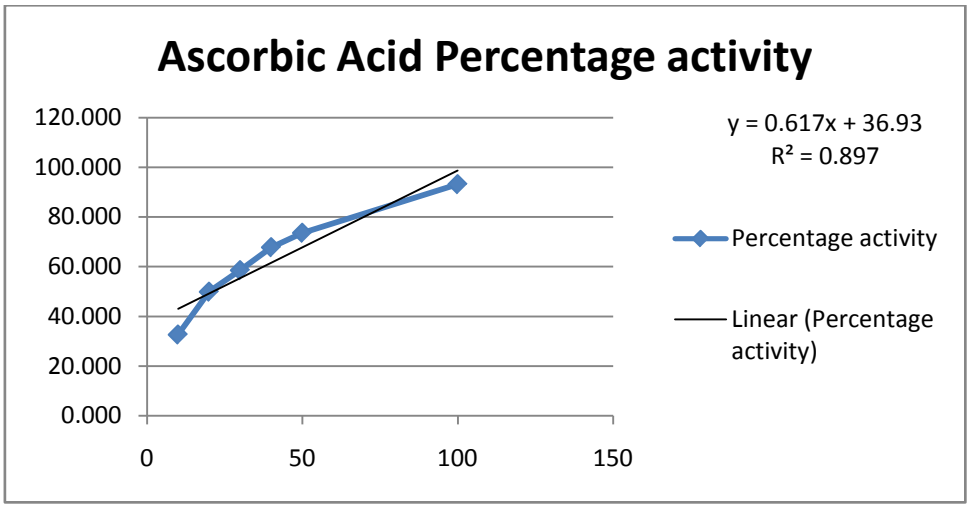
IC 50=21.18

Table no.3 H2O2 Assay of Soyabean

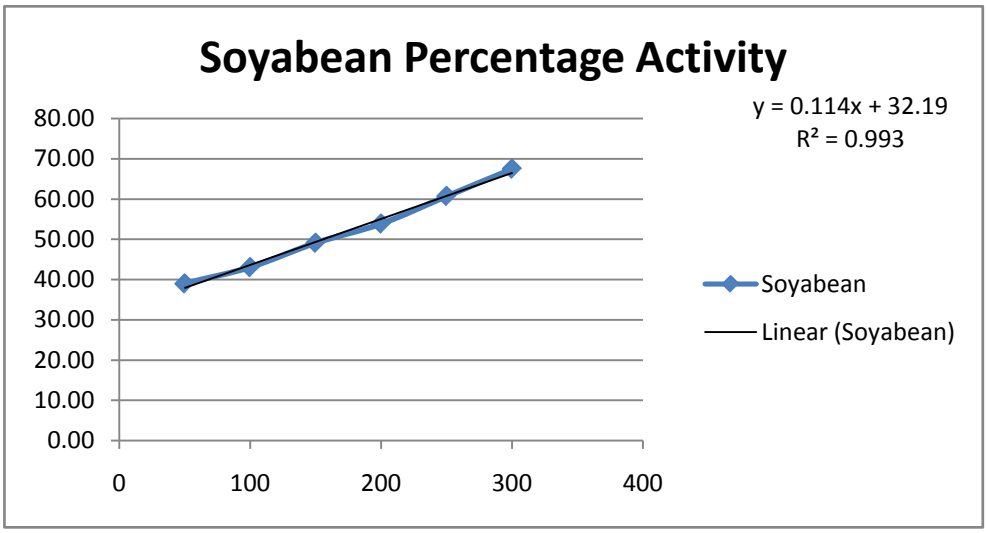
Conce-ntrations	Without H_2O_2	With 40mM H_2O_2	Difference	Percentage activity
50	0.033	1.558	1.525	39.00
100	0.139	1.563	1.424	43.04
150	0.295	1.568	1.273	49.08
200	0.420	1.574	1.154	53.84
250	0.596	1.579	0.983	60.68
300	0.777	1.591	0.814	67.44

IC 50=156.22

Hydrogen Peroxide scavenging assay graphs:



Graph no. 1 H2O2 Assay of Ascorbic acid



Graph no.2 H2O2 Assay of Soyabean

III. RESULT AND DISCUSSION

Preliminary phyto-chemical screening tests of methanolic extract of soya showed presence of Flavonoids, alkaloids, Proteins and amino acids, phenols and tannins. The scavenging ability of Soya on hydrogen peroxide is shown in Table no. 3 which is compared with ascorbic acid (Table no.2) as standards. The Soya extract was capable of scavenging hydrogen peroxide in an amount dependent manner. 50 - 300 µg Extracts of soya exhibited 39.00-67.44% scavenging activity on hydrogen peroxide. On the other hand, using 10-100 µg, ascorbic acid exhibited 32.680-93.200 % hydrogen peroxide scavenging activity. Results show that the scavenging effect of different extracts of soya on hydrogen peroxide was concentration-dependent (50-300 µg/mL).

The extract displayed strong H_2O_2 scavenging activity (IC 50=156.22 µg/mL). Whereas ascorbic acid extract exhibited IC 50=21.18 µg/mL. The significant difference in percentage inhibition of H_2O_2 of soya extract was compromising in Graph 1 and Graph 2.

IV. CONCLUSION

Soya showed presence of various bioactive compounds. Soya exhibited better H_2O_2 scavenging activity but comparatively less than ascorbic acid. The natural occurrence of H_2O_2 in the air, water, microorganisms, plants, the human body, and the food is at low concentration levels.

Extract of Soya capably scavenged hydrogen peroxide which may be due to the presence of phenolic groups that could neutralize it into H_2O by donating electrons to hydrogen peroxide.

V. FUTURE SCOPE

The antioxidant activity of soyabean can be further detected by methods like DPPH radical scavenging method and total phenolic content.

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