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Nutraceutical properties of *Stellaria media* (L.) chickweed

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Abstract
Herbs are often utilized in food and are essential for enhancing our well-being. Dietary antioxidant molecules are crucial for maintaining good health. Many different antioxidant components, including as carotenoids, phenolic compounds, and vitamins C and E, are found in many herbs that have been shown to display antioxidant activity. These compounds also operate as free radical scavengers. The present study was subjected to investigate the nutraceutical property and antioxidant activity of *Stellaria media* L. (Family-Caryophyllaceae) found available in Korba district agro-Climatic Condition. The ascorbic acid and phenolic content was observed in *S. media*. Free radical scavenging activity was evaluated using 1, 1-diphenyl-2-picrylhydrazyl (DPPH) free radical. In *S. media*, the methanolic extract value was found to be 1020±0.65 µg/ml. According to the study, this plant has strong antioxidant properties that make it a valuable medicinal agent. It can also be a rich source of nutrients for our diet.

Keywords: *Stellaria media*, antioxidant activity, DPPH, total phenolic content, ascorbic acid, gallic acid

Introductions
Our diet should have the right nutritional components that both promote and protect our health in order to maintain a healthy and active lifestyle. The availability of foods and local customs have a major influence on the dietary patterns of people in various parts of the world. The body's natural metabolic process results in the production of some free radicals, including super oxide, hydrogen peroxide, hydroxyl, and nitric oxide radicals. These radicals can be linked to the onset of many diseases, including cancer, rheumatoid arthritis, and atherosclerosis, as well as degenerative processes related to aging [1]. Almost all organisms are well protected against free radical damage by enzymes such as superoxide dismutase and catalase, or compounds such as ascorbic acid, tocopherols and glutathione [2]. When the mechanism of antioxidant protection becomes unbalanced by factors such as aging, deterioration of physiological functions may occur, resulting in diseases and accelerating aging. However the natural antioxidant such as vitamin C, E, carotenoids, phenolic compounds, etc. that are present in herbs and spices are responsible for inhibiting or preventing the deleterious consequences of oxidative stress exerted by the reactive oxygen species (ROS) [3]. It has been reported that the antioxidant activity of plant materials are well correlated with the content of their phenolic compounds [4, 5]. The human diet is largely composed of phenolic compounds, particularly phenolic acids and flavonoids, which are found in a wide variety of foods and beverages, including fruits, vegetables, tea, wines, and juices. Nutritive foods are, in general, those that offer both health-promoting and health-protective qualities in addition to providing nutrition.
The adaptation of common chickweed to nearly all environmental conditions makes it an extremely successful and pervasive weed, as discussed in this work. After five weeks of germination, it can begin producing seeds, and it can keep doing so for weeks or even months at a time. Unlike the seeds of many other weeds, seeds can germinate (sprout) as soon as they leave the plant and don't need to be further matured. Chick weed is a highly significant medicinal plant that grows in the Korba district.

Fig 1: Common Chick weed *Stellaria media* L

Material and Methods

Methods of analysis: Chemical analysis was done on moisture free basis. Analysis was carried out to estimate the macro nutrient components *viz.* total protein, total carbohydrates, crude fibre and ascorbic acid and antioxidant activity of the samples.

Total Protein Estimation: The total protein content of *S. media* was estimated by following the method developed by Lowry *et al.* (1962) [6]. Extraction was carried out with buffers used for the enzyme assay. 500 mg of the sample was grinded well with a mortar and pestle in 5ml of the buffer and after centrifuging; the supernatant was used for protein estimation. The reading was taken in UV-Vis Spectrophotometer at 660nm and the amount of protein present was calculated by plotting the value in a standard curve of Bovine Serum Albumin (BSA).

Total Carbohydrate Estimation: The total carbohydrate content of the samples was estimated by Anthrone method [7]. 100 mg dried samples were hydrolyzed with 2.5 N HCl for about 3 hours in a boiling water bath. Sodium carbonate was added to neutralize the extracts. Subsequently the extracts were centrifuged and supernatant were collected. The residue was washed thrice with distilled water and all the supernatants were pooled and final volume was adjusted to 100ml. 0.5ml of the extracts were taken and volume made up to 1ml distilled water. 4ml of Anthrone reagent was added to the above solution. Absorbance was taken in UV-Vis spectrophotometer at 630nm and the amount of carbohydrate present was calculated by plotting the value in a standard curve of standard Glucose solution.

Ascorbic acid content estimation

The amount of ascorbic acid present in the samples was calculated by extracting the sample in 4% oxalic acid and titrating the extract against the 2, 6-dichloro phenol indophenols dye until the end point where pink colour appears that persist for a few minutes [8]. The amount of dye consumed is equivalent to the amount of ascorbic acid present in the samples. Standard ascorbic acid solution was used as the reference and the calculation was done by the following formulae:

$$\text{Amount of ascorbic acid (mg/100 g) sample} = \frac{0.5 \times V_1 \times 100 \text{ ml}}{V_1 \text{ ml} \times 5 \text{ ml} \times \text{weight of the sample}} \times 100$$

Where V_1 = volume of oxalic acid, V_2 = volume of the sample.

Total Phenol Content Estimation

The total phenol content was determined by the Folin-Ciocalteau's method [9]. 200 µl of the sample extracts (1mg/ml) was taken and volume made up to 2 ml. 0.3 ml of Folin- Ciocalteau reagent was added. After 5 mins, 0.8 ml of 20% Na_2CO_3 was added and the final volume was made 5 ml. Absorbance was taken by UV-Vis Spectrophotometer at 765nm after 30 minutes incubation. The amount of phenol content was determined using Gallic acid as standard. Results were expressed as µg/mg (Gallic acid equivalent/dry weight).

Antioxidant activity estimation

The antioxidant activities of the sample extracts along with standard were assessed on the basis of the radical scavenging effect of stable DPPH [10]. A solution of DPPH of concentration 0.2 mM was prepared in 70% methanol and kept overnight. Stock solution (20 mg/ml) of the extract was prepared in 70% methanol. Various concentration of the extracts *viz.*10, 20, 50,100,150,200,300,400 and 500 µl were taken in different test tubes and the volume was made up to 1000 µl. 1ml DPPH was added to each solution and kept at dark for 30 minutes. Ascorbic acid and Gallic acid were taken as standards. Optical density of these samples was measured at 517 nm along with blank where 1ml methanol with 1 ml DPPH solution was taken. The activities of the samples are measured in terms of percent inhibition (IC50) and calculated by the following formulae:

$$\text{Percent (\%) inhibition of DPPH activity} = \frac{A-B}{A} \times 100$$

Where
A = Optical density of the blank
B = Optical density of the sample

Statistical Analysis

The data were subjected to statistical analysis. All the assays were recorded in triplicates and the values were expressed as mean ±S.D. IC_{50} value was calculated by plotting a graph with percent inhibition on y-axis and concentration on x-axis (Figs. 2 & 3).

Results and Discussion

The results are tabulated in Table no. 1.

Table 1: Phytochemical analysis of *Stellaria media* L

1.	Carbohydrate (%)	17.33±0.36
2.	Protein (%)	3.32±0.18
3.	Crude Fibre (%)	13.41±0.54
4.	Ascorbic Acid (mg/100gm)	42.04±0.61
5.	Total Phenol Content (µg GAE/mg)	25.32±0.35
6.	Inhibition concentration (IC_{50}) (µg/ml)	1020±0.65

*Values represented in the table are mean ± SD of three replicates.

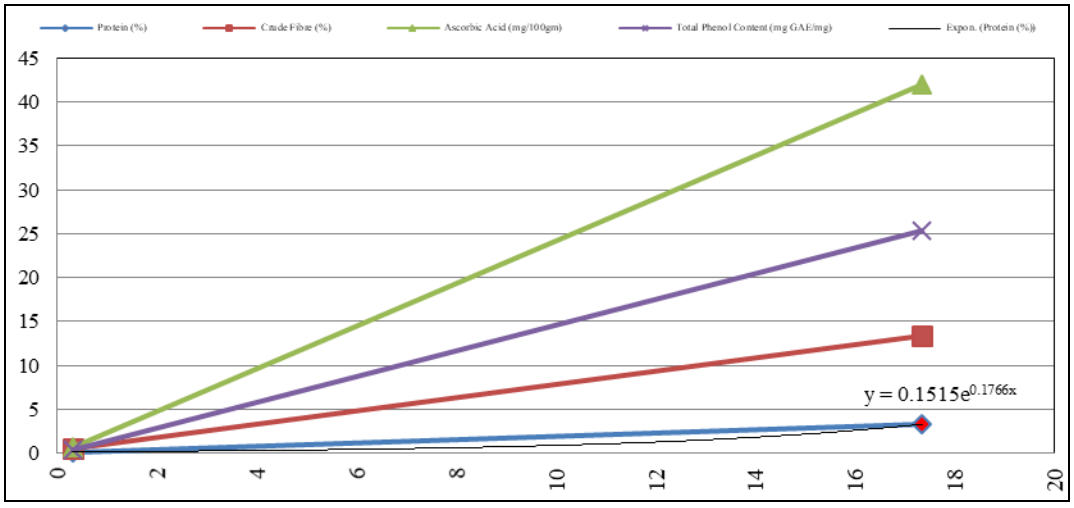

Fig 2: Graphics analysis of phytochemical analysis of *Stellaria media* L

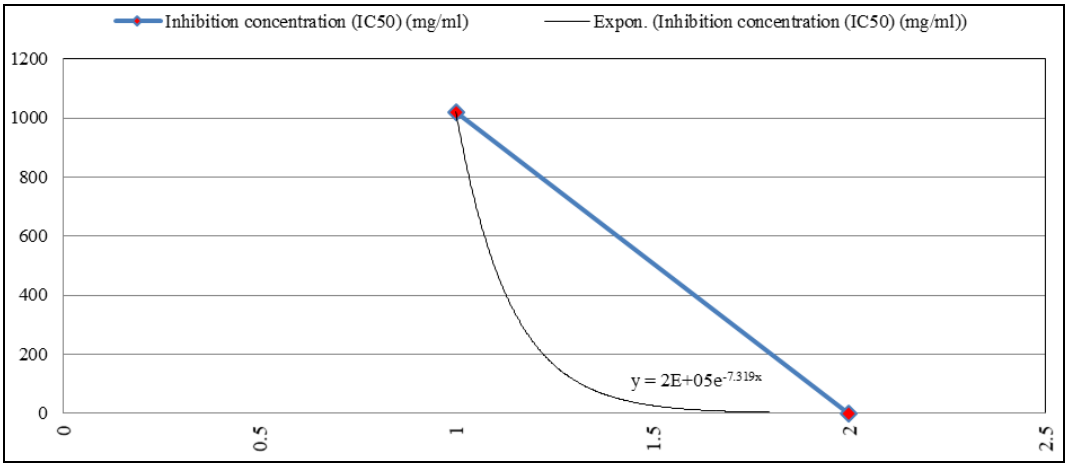

Fig 3: Graphics analysis of inhibition concentration (IC_{50}) (mg/ml)

The most prevalent antioxidants found in herbs include thiol (SH) chemicals, carotenoids, flavonoids, and vitamins C. According to a number of studies, phenolic compounds significantly outweighed vitamin C and carotenoids in their contribution to antioxidant activity [11-13]. According to the current study, phenolic chemicals rather than vitamin C may be the primary source of *S. media* antioxidant activity.

Conclusion

Concluded the plant also include a wealth of nutritional elements that are necessary for our daily diet, like protein, crude fiber, and carbohydrates. Consequently, consuming a balanced diet and supplementing with these natural antioxidants may be far more beneficial than taking supplements of specific antioxidants like vitamin C or E.

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