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Phytochemical Evaluation of Senna tora Linn

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Abstract

The seasonal variation of protein, amino acid, alkaloid and lipid content have been investigated from leaves, stem, root and seeds of Senna tora. Comparative account of protein contents of Senna tora showed higher level in seeds (26.648 mg/g dry wt.) than leaves (range 5.763 to 6.544 mg/g dry wt.), stem (range 3.785 to 4.341 mg/g dry wt.) and root (range 1.871 to 2.349 mg/g dry wt.). Comparative account of amino acid contents of Senna tora showed higher level in seeds (10.436 mg/g dry wt.) than leaves (range 0.085 to 1.143 mg/g dry wt.), stem (range 0.872 to 0.943 mg/g dry wt.) and root (range 0.287 to 0.324 mg/g dry wt.). Comparative account of alkaloid contents of Senna tora showed higher level in seeds (5.938 mg/g dry wt.) than leaves (range 3.109 to 3.749 mg/g dry wt.), stem (range 2.083 to 2.378 mg/g dry wt.) and root (range 0.854 to 1.015 mg/g dry wt.). Comparative account of lipid contents of Senna tora showed higher level in seeds (14.730 mg/g dry wt.) than leaves (range 8.638 to 9.630 mg/g dry wt.), stem (range 3.682 to 4.319 mg/g dry wt.) and root (range 1.232 to 1.914 mg/g dry wt.).

Keywords: Phytochemical; Protein; Amino acid, Alkaloid; Lipid; Senna tora.

Introduction

Plants and plant parts are the highest resource of drugs. Drugs are directly or indirectly dependent on plants for traditional systems of medicine, modern medicines, neutraceuticals, food supplements, folk medicines and pharmaceutical intermediate [1]. Nature has very rich botanical wealth and a huge num1ber of diverse types of plants grow in various parts of our country. 75-80% of the whole population are depends on herbal medicine [2]. Plants are used for food and a valuable part of human diet; their constituents and nutritional value has been intensively studied for decades. Primary metabolites (e.g., carbohydrate, lipid, protein and amino acids) are essential to higher plants and in addition they are also able to synthesize a different kinds of low molecular weight compounds, secondary metabolites [3].

The *Cassia tora* is known as Chakvad in Hindi [4]. The different plant parts are use in cure of cardiac disorders, dyspepsia, leprosy, ringworm, colic, constipation, flatulence, cough and bronchitis. Seeds are used to treat dysentery and eye diseases. Root are bitter in taste and used as tonic, stomachic and antidote against snake bite [5]. The leaf extracts having antibacterial activity against various human pathogens [6-10]. The of *Cassia tora* leaves are reported as antioxidant and antifungal properties [11]. The antiarthritic activity, antidiabetic activity and anticancer activity of *Cassia tora* leaf was reported [12-14].

Materials and Methods

1) The protein was quantitatively estimated by the Lowey method [15]. Chemicals: 0.1% N NaOH-(4 g in 1000 ml), 2% Na_2CO_3-(2 g in 100 ml distilled water), 0.5% $CuSO_4$-(0.5 g in 100 ml distilled water), 1% Na-K-tartarate and 5% Trichloro acetic acid/per chloric acid.

Reagents: Lowry A-2% Na_2CO_3in 0.1% N NaOH, Lowry B-5% $CuSO_4$ in 1% Na-K-tartarate and Lowry C-98 ml A and 2 ml B, Lowry D-Folin phenol reagent. Procedure:1g of plant material was homogenized with 10 ml, 80% ethanol. The extract was centrifuged at 5000 rpm. for 5 min. and the supernatant was discarded. 5%, 10 ml Trichloro acetic acid (TCA) or Per chloric acid (PCA) was add to residue and incubated at 80^0C for 20 min. The pellet was centrifuged, and the supernatant was discarded. Residue was washed with 10 ml distilled water and again recentrifuged. The supernatant was discarded. 2%, 10 ml Na_2CO_3 in 0.1 N NaOH was added to the residue and incubated for an hour at 30°C and again centrifuged and residue was discarded. The final volume of supernatant was measured, and it was used as a sample for protein. 1 ml of aliquot of sample was taken and 5 ml reagent C was added to it mixed it thoroughly. The sample was incubated for 10 min and 1 ml of reagent D was added to it. The colour intensity was read at 660 nm. Using Spectrophotometer. The protein concentration of an unknown sample was calculated by using standard graph.

2) The estimation of total amino acid was carried out [16]. Reagents: Alcoholic ninhydrin. (100 ml alcohol+400 mg ninhydrin) and Glycine (Std) (10 mg glycine+100 ml distilled water) Procedure:500 mg plant material was ground in mortar and pestle with few drops of cold 80% ethanol. Then 2.5 ml of distilled water and 10ml of boiling 80% ethanol were added to it. The extract was centrifuged for 15 min at 10,000 rpm. Residue was discarded the supernatant was collected and total volume was made 15 ml with distilled water. Test tube was kept at 60°C for 20 min. The test tube was cooled, and 1 ml 50% ethanol was added. Read at 420 nm in spectrometer. Glycine was used as stand rand.

3) Quantitative estimation of alkaloids was carried out [17]. Each sample was ground to fine powder, for each 1 g. 0.75 ml, 25% ammonium hydroxide, 1 ml, 95% ethyl ether were added. The material could macerate for 12 h and dried. The dried material was extracted with chloroform for 24 h in a Soxhlet apparatus and the extract obtained was evaporated to dryness and the residue was mixed with 2.5 ml, 0.1 ml Methanol (90%) HCL. The extract, thus obtained was centrifuged to take supernatant and discard pellet. The solution evaporated, and the total alkaloids were weight after drying at 100^0C.

4) The estimation of lipid was followed by the method of Agrawal et al. [18]. The material was dried for 12-17 h at 60-70^0C and grind to a coarse powder. 0.5 g. of weighed sample was taken in a cellulose thimble. The thimble was fixed in the Soxhlet funnel and about 150-200 ml of petroleum ether was taken in the flat bottom flask (FBF). The funnel over the flask was fixed and attached to the water condenser. Refluxed for at least 4 h and the heater were switched off to let the apparatus cool. Condenser and funnel were detached, petroleum ether was evaporated the flask, transferred it in weighed beaker (W1) of 50 or 100 ml. Rinsed the FBF twice with transferred in an oven at 70^0C till either evaporated (presence of ether can be detected by its smell). The beaker was cooled in a desiccator and weight (W2) Difference of (W1-W2) would give the oil content. The oil percentage was calculated based on the weight of plant material**.**

Results and Discussion

The protein content of leaves was higher (6.544 mg/g dry wt.) in summer over than winter (6.142 mg/g dry wt.) and monsoon (5.763 mg/g dry wt.). The range of protein content of stem was noted from (3.785 mg/g dry wt. to 4.341 mg/g dry wt.). The range of protein content in root was from (1.871 mg/g dry wt. to 2.349 mg/g dry wt.) and show higher in summer. The protein content of root was very low in all season. The protein content of seeds was higher (26.648 mg/g dry wt.) as compared to leaves, stem and roots of all seasons. The protein content showed increasing order of root<stem<leaves<seeds (Figure 1 and Table 1).

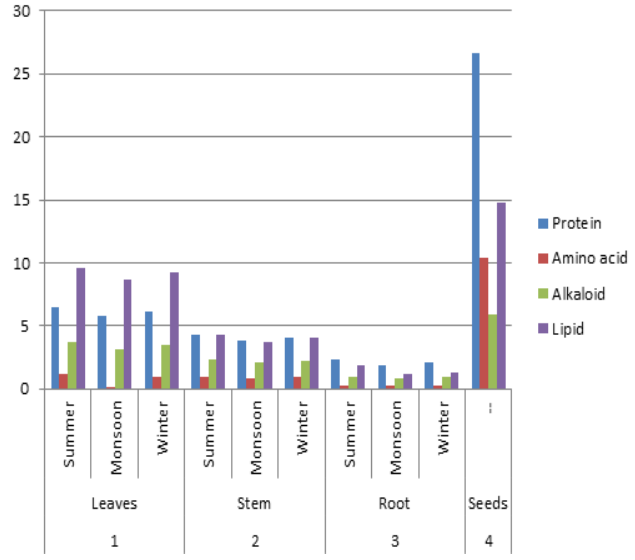

Figure 1: Seasonal variation of Protein, Amino acid, Alkaloid and Lipid levels of different plant parts of *Cassia tora*.

The amino acids content of leaves was 1.143 mg/g dry wt. in summer, 1.009 mg/g dry wt. in winter and 0.085 mg/g dry wt. in monsoon. Higher being observed during summer i.e. 1.143 mg/g dry wt. The range of amino acids content in stem 0.872 mg/g dry wt. to 0.943 mg/g dry wt.

Maximum concentration of amino acids was noted during summer 0.943 mg/g dry wt. The range of amino acid content of root was low from 0.287 mg/g dry wt. to 0.324 mg/g dry wt. The amino acids content of seeds was higher (10.436 mg/g dry wt.) as compared to leaves, stem and roots of all seasons. Generally, the concentration of amino acids was found to be in increasing order of root<stem<leaves<seeds (Figure 1 and Table 1).

The alkaloids content of leaves was ranging from (3.109 mg/g dry wt. to 3.749 mg/g dry wt.) and attained its peak concentration (3.749 mg/g dry wt.) during summer season. The range of alkaloid content was from (2.083 mg/g dry wt. to 2.378 mg/g dry wt.) in stem and from (0.854 mg/g dry wt. to 1.015 mg/g dry wt.) in root during the three seasons tested.

Highest concentration observed in summer season i.e. (1.015 mg/g dry wt. and 0.932 mg/g dry wt.) in winter. Seeds content highest (5.938 mg/g dry wt.) amount of alkaloid content compared to leaves, stem and roots of all seasons. The alkaloids content was in increasing order from wood<stem<leaves<seeds (Figure 1 and Table 1).

The estimation of lipid content was carried out in different parts like leaves, stem and root of *Cassia tora*. during summer, monsoon and winter seasons. The lipid concentration of leaves was higher in summer (9.630 mg/g dry wt.) over that of monsoon (8.6380 mg/g dry wt.) and winter (9.239 mg/g dry wt.).

The stem of lipid concentration was ranging from (3.682 mg/g dry wt. to 4.319 mg/g dry wt.) and significantly higher in summer (4.319 mg/g dry wt.) The lipid content of root was comparatively low (1.232 mg/g dry wt. to 1.914 mg/g dry wt.).

Seeds content highest (14.730 mg/g dry wt.) amount of lipid content compared to leaves, stem and roots of all seasons (Figure 1 and Table 1).

Table 1: Seasonal variation of lipid, alkaloid, proteins and amino acid levels of different plant parts of *Cassia tora*.

S. No.	Plant parts	Season	Protein (mg/g dry wt.)	Amino acid (mg/g dry wt.)	Alkaloid (mg/g dry wt.)	Lipid (mg/g dry wt.)
1	Leaves	Summer	6.544	1.143	3.749	9.630
		Monsoon	5.763	0.085	3.109	8.638
		Winter	6.142	1.009	3.476	9.239
2	Stem	Summer	4.341	0.943	2.378	4.319
		Monsoon	3.785	0.872	2.083	3.682
		Winter	4.053	0.904	2.184	4.068
3	Root	Summer	2.349	0.324	1.015	1.914
		Monsoon	1.871	0.287	0.854	1.232
		Winter	2.109	0.310	0.932	1.348
4	Seeds	--	26.648	10.436	5.938	14.730

Conflict of Interest

None declared.

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