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RESEARCH ARTICLE

Seasonal variation in biochemical values of *Senna tora* Linn.

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ABSTRACT

The seasonal variation of phenol, tannin and ascorbic acid content have been investigated from leaves, stem, root and seeds of *Senna tora.* Comparative account of phenol contents of *Senna tora* showed higher level in leaves (range 5.740 to 6.408 mg/g dry wt.) than stem (range 3.768 to 4.419 mg/g dry wt.), root (range 1.284 to 1.828 mg/g dry wt.) and seeds (3.873 mg/g dry wt.) . Comparative account of tannin contents of *Senna tora* showed higher level in leaves (range 0.356 to 0.410 mg/g dry wt.) than stem (range 0.300 to 0.356 mg/g dry wt.), root (range 0.112 to 0.156 mg/g dry wt.) and seeds (2.940 mg/g dry wt.). Comparative account of ascorbic acid contents of *Senna tora* showed higher level in leaves (range 3.011 to 3.620 mg/g dry wt.) than stem (range 1.988 to 2.612 mg/g dry wt.), root (range 0.970 to 1.109 mg/g dry wt.) and seeds (2.067 mg/g dry wt.)

Keywords: Phenol, tannin, ascorbic acid and *Senna tora.*

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CONTENTS

1. Introduction

Plants are an important part of our everyday diet, their constituents and nutritional value has been intensively studied for decades. In addition to essential primary metabolites (*e.g.*, carbohydrate, lipid, protein and amino acids), higher plants are also able to synthesize a wide variety of low molecular weight compounds, the secondary metabolites (Kadam et. al., 2013). Plant secondary metabolites can be defined as compounds, that have no recognized role in the maintenance of fundamental life processes in the plants but they do have an important role in the interaction of the plants with its environment (Sirikantaramas *et al*., 2008). Use of plants for the treatment of many diseases dated back to prehistory and people of all continents have this old tradition. Every culture on earth has relied on the vast variety of natural chemistries' found in plants for their therapeutic properties (Seyyed, et.al, 2010). Beyond this pharmaceutical approach to plants, there is a wide tendency to utilize herbal product to supplement the

diet, mainly with the intention of improving the quality of life and preventing the diseases of elderly people (Maffei. 2003). Despite the remarkable progress in the preparation of synthetic drugs, over 25% of prescribed medicines in industrialized countries are derived directly from plants (Newman et.al, 2000). Plant synthesizes a wide variety of chemical compounds, which can be sorted by their chemical class, biosynthetic origin and functional groups into primary and secondary metabolites (Kumar et.al, 2011). *Senna tora* Linn. is one of the wild herbs which is well known for its medicinal attributes. Various bioactive compounds present in stem, roots, seeds, leaves as well as its pods. *Sennatora* has shown tremendous applications in both traditional and modern medical practices. The pharmacological profile reveals it to be for its good anti-oxidant activity, anti-microbial activity, antidiabetic activity, anti-inflammatory activity, immune stimulatory activities, hepatoprotective activity, antitumor activity, oxytocic activity, anthelmintic activity etc. The antibacterial activity of leaf extracts on various human pathogens were reported by (Rao *et al*, 2012; Gill *et al*, 2011). The antifungal activity of leaf extract was reported by (Mukherjee *et al*, 1996). The antiarthritic activity of *Cassia tora* plant parts was reported by (Balekar *et al*, 2013). The antidiabetic activity of *Cassia tora* leaf was reported by (Chaurasia *et al*, 2011; C.S. Rejiya *et al*, 2009). Anticancer properties of *Cassia tora* leaves have reported by (Chaurasia *et al*, 2011; Rejiya *et al*, 2009).

2. Materials and Methods

1) Total Phenols:

The concentration of total phenols in the plant extract was determined by using Folin method (Malick and Singh, 1980) .Catechol was used as standard. 0.2 ml ethanolic (80%) extract (4 mg/ml) of plants and 0.2 ml Folin reagent were mixed thoroughly. After 4 min, 1 ml of 15 % sodium carbonate was added and the mixture was allowed to stand for 2 hours at room temperature. The absorbance was measured at 760 nm. The concentration of total phenols was measured equivalent to catechol (as a standard drug) by using standard calibration curve of catechol.

2) Total Tannin:

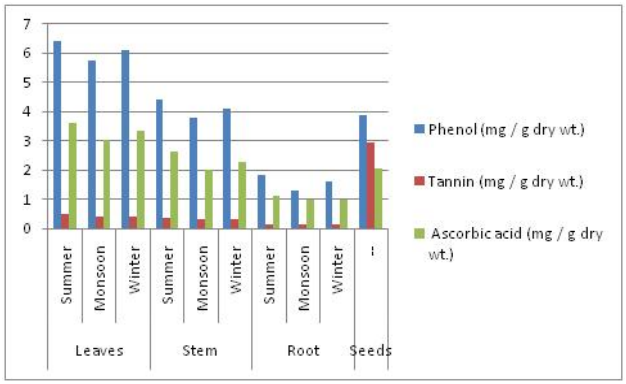
Total tannin in plant extract was determined by Folin–Denis method (Schanderi, 1970). 0.5 g of powdered drug was boiled for 30 min with 75 ml of double distilled water. It was cooled, centrifuged at 2000 rpm for 20 min and supernatant was collected in 100 ml volumetric flask and the volume was made up with double distilled water. 1 ml of this solution was transferred to a 100 ml volumetric flask containing 75 ml water and 5 ml of Folin–Denis reagent + 10 ml of sodium carbonate solution were added and diluted up to 100 ml with water. After shaking, the absorbance was read at 700 nm after 30 min. Blank solution was prepared with water instead of the sample. Standard graph was prepared by using 0-100 μg of tannic acid. Total tannin content of the sample was measured equivalent to tannic acid by standard graph.

3) Ascorbic Acid:

Total ascorbic acid content in plant extract was determined by (Sadasivam and Balasubraminan, 1987) method. 2 g dried powdered sample was extracted with 4 % oxalic acid and the volume was made up to 100 ml. It was centrifuged at 1000 rpm for 10 min. 5 ml supernatant liquid was transferred to a conical flask and 10 ml of 4 % oxalic acid was added. It was titrated against standard dye solution (2, 6-dichlorophenolindophenol) to a pink end point. The procedure was repeated with a blank solution (without adding sample). 5 ml ascorbic acid of 100 ppm was used as standard. Ascorbic acid content was calculated using the formula.

3. Results and Discussion

The phenolcontent of leaves was higher (6.408 mg/g dry wt.) in summer over than winter (6.102 mg/g dry wt.) and monsoon (5.740 mg/g dry wt.). The range of phenol content of stem was from (3.768 mg/g dry wt. to 4.419mg/g dry wt.). The range of phenol content in root was from 1.284mg/g dry wt. to 1.828mg/g dry wt. and show higher in summer. The phenol content of root was very low in all season. The phenol content of seeds was higher (3.873 mg/g dry wt.) as compared to leaves, stem and roots of all seasons. The phenol content showed increasing order of root<stem<leaves<seeds (Table No.1and Graph No.1). The tannin content of leaves was (0.470 mg/g dry wt.)in summer, (0.383 mg/g dry wt.) in winter and (0.410mg/g dry wt.) in monsoon, higher being observed during summer i.e. (0.470 mg/g dry wt.).The range of tannin content in stem (0.300 mg/g dry wt.to 0.356 mg/g dry wt.).Maximum concentration of tannin was noted during summer (0.356 mg/g dry wt.).The range of tannin content of root was low from (0.112 mg/g dry wt.to 0.156). The tannin content of seeds was higher (2.940 mg/g dry wt.) as compared to leaves, stem and roots of all seasons. Generally, the concentration of tannin were found to be in increasing order of root<stem< leaves<seeds (TableNo.1and Graph No. 1). The ascorbic acid concentration of leaves was higher in summer (3.620 mg/g dry wt.) over that of monsoon (3.011 mg/g dry wt.) and winter (3.345 mg/g dry wt.). The stem of ascorbic acid concentration was ranging from (1.988 mg/g dry wt. to mg/g dry wt.) and significantly higher in summer (2.612 mg/g dry wt.). The ascorbic acid content of root was comparatively low (0.970 mg/g to 1.109 mg/g) .Seeds content lowest (2.067mg/g dry wt.) amount of ascorbic acid content compared to leaves of all seasons (TableNo.1 and Graph No.1).



Graph No.1- Seasonal variation of phenol, tannin and ascorbic acid levels of different plant parts of *Senna tora*.

Table 1: Seasonal variation of phenol, tannin and ascorbic acid levels of different plant parts of *Senna tora*.

Sr. No.	Plant part	Season	Phenol (mg / g dry wt.)	Tannin (mg / g dry wt.)	Ascorbic acid (mg / g dry wt.)
1	Leaves	Summer	6.408	0.470	3.620
		Monsoon	5.740	0.383	3.011
		Winter	6.102	0.410	3.345
2	Stem	Summer	4.419	0.356	2.612
		Monsoon	3.768	0.300	1.988
		Winter	4.102	0.329	2.294
3	Root	Summer	1.828	0.156	1.109
		Monsoon	1.284	0.112	0.970
		Winter	1.596	0.134	1.003
4	Seeds	--	3.873	2.940	2.067

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