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ESTIMATION OF TOTAL PHENOL IN DIFFERENT PLANT PARTS OF GENUS SESBANIA IN MAHARASHTRA

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Abstract: An attempt has been made here to investigate occurrence of total phenol in the leaves , bark and wood of *Sesbania rostrata* , *Sesbania exaltata* and *Sesbania sesban* are the medicinal plants in Maharashtra. Comparative account of total phenol content of leaves ,bark and wood of three species revealed that , *Sesbania exaltata* were rich (range 2.807 to 4.900 mg/g dry wt.) than *Sesbania rostrata* (range 2.456 to 4.665 mg/g dry wt.) and *Sesbania sesban* (range 2.151 to 4.233 mg / g dry wt.) .

Keywords: Total Phenol, Medicinal Plants, Genus Sesbania



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INTRODUCTION

There are many phenolic compounds which have gained importance as plant growth regulators in recent years. The phenolic compounds have been found to occur in micro-organisms, pteridophytes, gymnosperms and angiosperms. Earlier, most of the phenolic compounds are believed to be inhibitory in nature. From careful studies with the different concentrations of phenolic compounds it followed that many of them could stimulate physiological and biochemical processes at very low concentration.

Medicinal plants have been used as traditional treatments for numerous human diseases for thousands of years. Plants have always played a major role in the treatment of human traumas and diseases worldwide. They have been used as sources of modern drugs, either by providing pure compounds, starting materials for partial synthesis of useful compounds or models for synthesis of new drugs. According to the World Health Organization, as much as 80% of world's population depends on traditional medicine for their primary health care needs (Azaizeh et al., 2003).

Sesbania rostrata as an important dietary nutritive source in southeast Asian country's. *Sesbania rostrata* are richest source of amino acid, minerals and antioxidants vitamins. This species is unique because it fixes nitrogen not only in its roots in the soil, but also in its aerial parts including stems and branches (Dutt

et.al., 1983). Various parts of this plant are used in Indian traditional medicine for the treatment of diuretic, emetic, fevers, headaches, anemia, bronchitis, inflammation, leprosy, gout, rheumatism, anxiolytic, anticonvulsive and hepatoprotective (Pari and Uma, 2003). It also has anti inflammatory, analgesic and antipyretic activity (Momin et.al., 2012). Primarily used as green manure between rice crops (Shahjalal and Topps, 2000).

Sesbania exaltata (Synonyms- *Sesbania herbacea* and *Sesbania macrocarpa*) is a crop generally cultivated for its nutritive value to soil. It is cultivated in monsoon season almost throughout India and grows sandy, loamy and clay soils. It is an ideal green manure crop as it is quick-growing, succulent, and easily decomposable with low moisture requirements and produces maximum amount of organic matter and nitrogen in the soil. Seed flour is used in the treatment of ringworm, skin diseases and wounds. The mature seeds of this species are known to be cooked and eaten by the Indian tribal's (Brown, 1954).

Sesbania sesban seeds considered stimulants and astringent. Leaves considered purgative, anthelmintic and anti inflammatory. Study of the effect of *Sesbania sesban* seed powder on female albino rats showed inhibition of ovarian function, change of uterine structure and prevention of implantation with 100% control of fertility (Shiv Pal Singh, 1990).

The aqueous extracts of leaves in STZ-induced diabetic rats showed significant increase in serum insulin and HDL level and decreases in blood glucose, total cholesterol and triglycerides when compared to glibenclamide (Pandhare et.al.,2011). *Sesbania sesban* was referred to as milk shrub. Farmers were encouraged to feed *Sesbania* fodder to lactating cows to enhance milk secretion (Brown, 1954)

MATERIALS AND METHODS

The plant material of *Sesbania rostrata*, *Sesbania exaltata* and *Sesbania sesban* were collected from different places in Maharashtra during different seasons viz. summer (April), monsoon (June) and winter (November). The ethanol extractable phenolic compounds were estimated by folin method of Swain and Hillis (1959).

Phenolic compounds were extracted by grinding 50 mg (dry weight) sample of tissue using a chilled pestle and mortar with an aliquot of chilled 80 % (V / V) ethanol . The homogenate was centrifuged at 13000 rpm for 15 minutes . The supernatant was collected and residue pellet was extracted twice more as above . The supernatant of all three extractions was pooled and volume made up to 25 ml with 80 % ethanol . A suitable aliquot of the ethanolic extract was diluted with distilled water to 8.5 ml and after adding 0.5 ml of Folin phenol reagent . The content were mixed well , three minutes later , 1 ml of

saturated sodium carbonate solution (1 gm / 3 ml) of distilled water was added and the mixture shaken thoroughly . Colour was allowed to develop for 60 minutes and then read at 725 nm in spectrophotometer . Standard curve was prepared using chlorogenic acid / tannic acid / gallic acid and all the concentrations were expressed in terms of mg / g of this compound .

RESULTS AND DISCUSSION

The concentration total phenol of *Sesbania rostrata* were ranging from 4.42 to 4.66 mg/g dry wt. in leaves . The total phenol content of bark of *Sesbania rostrata* exhibited maximum levels in summer (4.22 mg/g dry wt.) over that of monsoon (4.01 mg/g dry wt.) and winter (4.14 mg/g dry wt.) (Table 1.) . The total phenol content of wood of *Sesbania rostrata* was not significantly different (as it ranges between 2.45 to 2.62 mg / g dry wt.) from other parts during various seasons . The repeated measuring of total phenol continuously for two years proved that there was no much difference in their different parts .

The total phenol content of leaves of *Sesbania exaltata* was raised in summer (4.90 mg / g dry wt.) over that of monsoon (4.78 mg / g dry wt.) and winter (4.83 mg / g dry wt.). The total phenol content in bark of *Sesbania exaltata* was highest in summer (4.65 mg / g dry wt.) over that of winter (4.59 mg / g dry wt.) and monsoon (4.52 mg / g dry wt.) . The total phenol

content of wood of *Sesbania exaltata* was raised in summer (2.95mg / g dry wt.) over that of winter (2.88 mg / g dry wt.) and monsoon (2.80 mg / g dry wt.).

The total phenol content of leaves of *Sesbania sesban* was higher in summer (4.23 mg / g dry wt.) over that of winter (4.16 mg / g dry wt.) and monsoon (4.07 mg / g dry wt.). Total phenol content of bark of *Sesbania sesban* ranged from (4.00 to 4.08 mg / g dry wt.) . Comparatively wood of *Sesbania sesban* exhibited low concentration of phenol content (2.15 to 2.26 mg / g dry wt.) .

The total phenol content of leaves of *Sesbania exaltata* was higher (ranged

from 4.78 to 4.90 mg / g dry wt.) than *Sesbania rostrata* (ranged from 4.42 to 4.66 mg/g dry wt.) and *Sesbania sesban* (ranged from 4.07 to 4.23 mg / g dry wt.). Comparatively bark of *Sesbania exaltata* was higher (ranged from 4.52 to 4.65 mg / g dry wt.) than *Sesbania rostrata* (ranged from 4.01 to 4.22mg / g dry wt.) and *Sesbania sesban* (ranged from 3.93 to 4.08 mg / g dry wt.). Comparatively phenol content of wood of *Sesbania exaltata* was higher (ranged from 2.80 to 2.95 mg / g dry wt.) than *Sesbania rostrata* (ranged from 2.45 to 2.62 mg / g dry wt.) and *Sesbania sesban* (ranged from 2.15 to 2.26 mg / g dry wt.).

Table 1

Seasonal variations of total phenol content of different plant parts of *Sesbania rostrata*, *Sesbania exaltata* and *Sesbania sesban*

Plant parts	Season	TOTAL PHENOL (mg / g dry wt.)		
		<i>Sesbania rostrata</i>	<i>Sesbania exaltata</i>	<i>Sesbania sesban</i>
Leaves	Summer	4.665	4.900	4.233
	Monsoon	4.420	4.788	4.079
	Winter	4.534	4.834	4.164
	Summer	2.623	2.954	2.268

Wood	Monsoon	2.456	2.807	2.151
	Winter	2.566	2.888	2.205
	Summer	4.220	4.653	4.087
Bark	Monsoon	4.012	4.525	3.935
	Winter	4.145	4.595	4.002

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