

Phytochemical screening, antimicrobial and pesticidal activity in root, stem, and leaves extract of *Parthenium hysterophorus*

Patil MS, Baviskar PS and Ahirrao AP

Department of Botany, B. P. Art's, S. M. A. Science, & K. K. C. Commerce, College, Chalisgaon

Corresponding author: pbaviskar2@gmail.com

Manuscript details:	ABSTRACT
<p>Available online on http://www.ijlsci.in</p> <p>ISSN: 2320-964X (Online) ISSN: 2320-7817 (Print)</p> <p>Editor: Dr. Arvind Chavhan</p> <p>Cite this article as: Patil MS, Baviskar PS and Ahirrao AP (2015) Phytochemical screening, antimicrobial and pesticidal activity in root, stem, and leaves extract of <i>Parthenium hysterophorus</i>, <i>International J. of Life Sciences</i>, A3:119-122.</p> <p>Copyright: © Author, This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>The present research work was carried out to study the phytochemical screening, antimicrobial and pesticidal activity in root, stem and leaves extract of <i>Parthenium hysterophorus</i>. This study was conducted during 2013 to 2015. The extraction was done by using soxhlet apparatus and studied the phytochemical screening for alkaloids, cholesterol, flavinoids, terpenoids, diterpines, saponins, phenol resins, tannins and cardiac glycosides. In antimicrobial activity it was concluded that <i>P. hysterophorus</i> shows highest antimicrobial activity 12.66 mm in <i>Lactobacillus sporogense</i> and least antimicrobial activity recorded in stem extract in <i>Staphylococcus aureus</i> measured 3 mm. and pesticidal activity against <i>Tribolium</i> sp. and <i>Oryzaephilus</i> sp. And in pesticidal activity the l extract of p. Extract of <i>P. hysterophorus</i> shows significant lethal effect against <i>Tribolium</i> sp. and <i>Oryzaephilus</i> sp. The 50% lethal effect shows at a 6% conc. in a root and stem extracts. While in a root extract it's at 8% concentration.</p> <p>Keywords: Antimicrobial, phytochemical, pesticidal, soxhlet.</p> <p>INTRODUCTION</p> <p>Parthenium is commonly called as congress grass, carrot weed, bitter weed, gajar grass etc. At present it occupies almost all part of India. It is native of sub tropics of north and south America & it accidentally introduced in Indian subcontinent. It is an annual herb with a deep tap root system and an erect stem that becomes woody with age. As it matures, the plant develops many branches in its top half and may eventually reach a height of two meters. Plant produces a diverse range of bioactive molecules, making them rich source of different types of medicines. Most of the drugs today are obtained from natural sources or semi synthetic derivatives of natural products and used in the traditional systems of (Sukanya <i>et al.</i>, 2009). It's leaves are pale green, deeply lobed & covered within soft hairs. Small creamy white flowers occur on the tips of numerous stems. Each flower contains four to five black seeds that are wedge-shaped, two millimeters long with two thin, white scales. It weed normally germinates in spring and early summer, produces flowers and seeds throughout its life and dies around late autumn. However, with suitable conditions (rain,</p>

available moisture, mild temperatures), Parthenium weed can grow and produce flowers at any time of the year. In summer, plants can flower and set seeds within four weeks of germination, particularly if stressed. Parthenium weed is a vigorous species that colonizes weak pastures with sparse ground cover. It will readily colonise disturbed, bare areas along roadsides and heavily stocked areas around yards and watering points. It can also colonise brigalow, gidgee and softwood scrub soils. Its presence reduces the reliability of improved pasture establishment and reduces pasture production potential. The contact with plant or the pollen can cause serious allergic reactions such as dermatitis and hay fever. This weed is known to cause many health hazards which have now reached epidemic proportions. Agriculturists are concerned about *P. hysterophorus* affecting food and fodder crops, since the pollen and dust of this weed elicit allergic contact dermatitis in humans. Parthenin the active compound present in *Parthenium hysterophorus* is known to show activity against termites, cockroaches (Tilak, 1977). As well as migratory grasshoppers, *Melanoplus sanguinipes* (Picman et al., 1981). Antimicrobial compounds of plant origin may be found in plant stems, roots, leaves, bark, flowers, or fruits (Beuchat et al., 1994). The present study focuses on phytochemical screening, antimicrobial activity and pesticidal activity in ethanol extract of root, stem, and leaves.

MATERIALS AND METHODS

This study was conducted in Department of Botany, B.P. Arts, S.M.A. Science and K.K.C. Commerce College Chalisgaon (M.S.) India. We determined the phytochemical screening, antimicrobial and pesticidal activity in root, stem, and leaves extract of *Parthenium hysterophorus*.

Collection and preservation of plant samples: Fresh roots, stem and leaves of *Parthenium hysterophorus* were collected in the month of August 2014 from local area of Chalisgaon town. These samples were dried for one day to eliminate surface moisture. Then roots, stem and leaves were packed into envelopes and kept in oven at 55°C temperature until dried. Dried roots, stem and leaves were ground separately in a mortar to obtain powder which was then kept in plastic bags for further use.

Preparation of extract: 20 gm of leaves, stem and seeds powders were extracted with 140 ml of solvent (Ethanol) for 24 hr. by using Soxhlet apparatus. Extracts were used for different tests.

Preliminary phytochemical analysis: Preliminary phytochemical screening of *Parthenium* was done following the standard procedures adapted by the various workers. (Daniel, 1991; Harborne, 1998; Kokate et al., 2004).

Qualitative phytochemical study: Qualitative phytochemical study was done on root, stem and leaves extract of *Parthenium hysterophorus*. The test was done by using standard protocols. Qualitative analysis was done for phytochemicals such as alkaloids, cholesterol, flavonoids, terpenoids, diterpenes, saponins, phenol resins, tannins and cardiac glycosides.

Antimicrobial activity: Four different species of bacteria will be used in this study to explore the effectiveness of root, stem and leaves ethanol extract of *P. hysterophorus* on inhibition of growth; the bacteria chosen for this study are both of Gram positive and Gram negative bacteria. The four bacterial species, which would be used in this study are: *Escherichia coli*, *Pseudomonas auriginosa*, *Lactobacillus sporogense* and *Staphylococcus aureus*. The experiment method employed for this investigation was the agar well Diffusion Assay method, it was chosen because it was the easiest and the simplest method to use.

Pesticidal activity: Insect rearing- The target insect *Tribolium sp.* and *Oryzaephilus sp.* was reared by using standard laboratory method. Both pests were reared on wheat flour in separate flask. Healthy adults were separated time to time from dead insects and kept in special flask. The optimum temperature was 30°C. The extract was mixed into diet of insect. And control was used as water. Each concentration of extract mixed into diet and kept in diet and kept in different flask. Each flask contained ten adult insects. The flask was stored at 25-30°C and 70-75% relative humidity with 16; 8 photoperiod. Adult mortality period was observed after 48 hours.

RESULTS

The present study carried out on the *P. hysterophorus* revealed the presence of medicinal active constituents. The phytochemical active compounds of *P. hysterophorus*

were qualitatively analyzed for stem, roots and leaves separately and the results are presented in Table1 In these screening process alkaloids, tannins, saponins, flavonoids and terpenoids, glycosides, phenols shows different types of results indifferent plant parts extract These phytochemicals have certain medicinal

value against chronic diseases. The ethanolic extract of leaves, stem and roots contains Alkaloids, cholesterol, flavonoid, terpenoid, saponine, resins, tannineand cardiac glycoside. Whereas root extract of *Parthenium hysterophorus* does not contain phenols.

Table 1: Preliminary Phytochemicals Screening *Parthenium hysterophorus*

Sr.No.	Phytochemicals	Extract of <i>Parthenium hysterophorus</i>			Control
		Roots	Stem	Leaves	
1.	Alkaloids	+	+	+	-
2.	Cholesterol	+	+	+	-
3.	Flavonoids	+	+	+	-
4.	Diterpines	+	+	+	-
5.	Saponines	+	+	+	-
6.	Phenols.	-	+	+	-
7.	Resins	+	+	+	-
8.	Tannins	+	+	+	-
9.	Fixed oil	+	+	+	-
10.	Cardiac glycoside	+	+	+	-

Table 2: Antimicrobial activity in *Parthenium hysterophorus*.

Sr.No.	Bacterial strains	Ethanol extract of <i>Parthenium hysterophorus</i> (Average zone of inhibition in mm)			Control
		Root	Stem	Leaves	
1.	<i>Escherichia coli</i>	2.66	05	5.33	00
2.	<i>Pseudomonas auriginosa</i>	03	04	06	00
3.	<i>Lactobacillus sporogense</i>	12.66	6.66	3.33	00
4.	<i>Staphylococcus aureus</i>	09	03	3.33	00

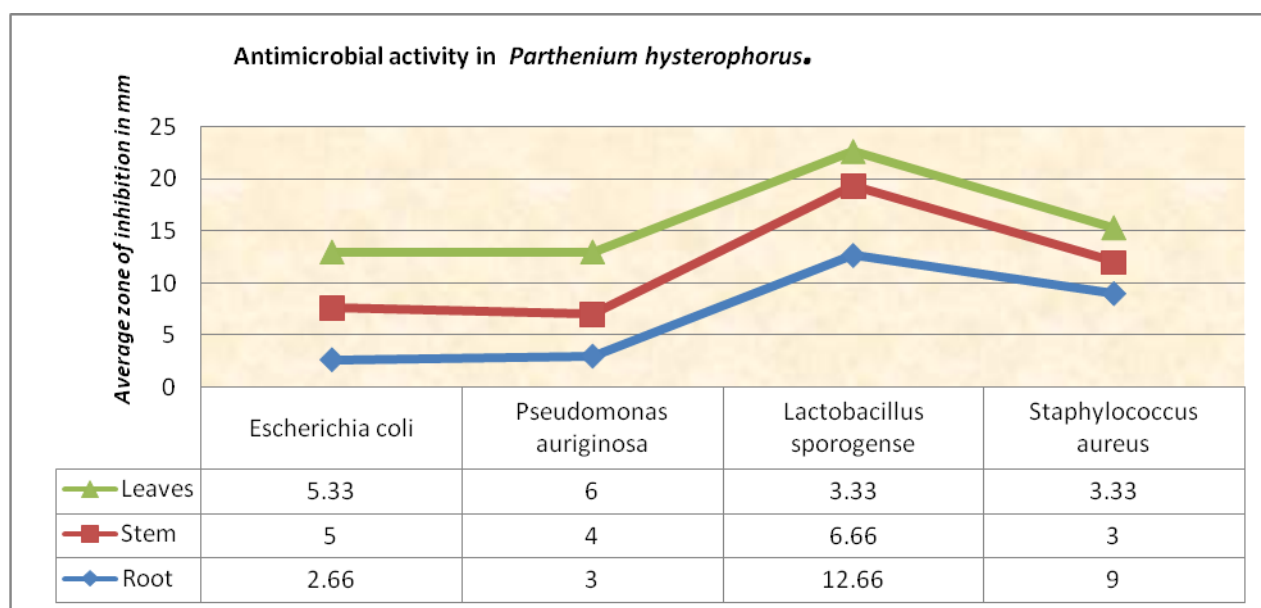


Table 3: Pesticidal activity in *Parthenium hysterophorus*

Sr.No	Sample	Conc.	Mortality % after 48 hrs.		
1)	Control		<i>Tribolium sp.</i>	<i>Oryzaephilus sp.</i>	Control
2)	Root	2	02	20	02
		4	02	20	02
		6	06	80	02
		8	60	80	02
		10	100	100	02
3)	Stem	2	00	60	02
		4	40	60	02
		6	80	100	02
		8	100	100	02
		10	100	100	02
4)	Leaves	2	02	20	02
		4	20	20	02
		04	50	20	02
		8	100	80	02
		10	100	100	01

Results obtained in antimicrobial activity that the tested *P. hysterophorus* plants Root, stem and leaves extracts possess potential antibacterial activity against *E. coli*, *Pseudomonas auriginosa*, *Lactobacillus sporogense* and *Staphylococcus aureus*. (Table 2) When these extract were checked by agar well diffusion method, the root extract of *P. hysterophorus* shows highest antimicrobial activity 12.66 mm in *Lactobacillus sporogense* and least antimicrobial activity recorded in stem extract in *Staphylococcus aureus* measured 3mm. The Gram negative bacteria *Escherichia coli*, *Pseudomonas auriginosa* shows resistance against root, stem and leaves extract of *Parthenium*. But Gram positive bacteria *Staphylococcus aureus*, *Lactobacillus sporogense* are susceptible against root, stem and leaves extract of *Parthenium*. The root extract of *Parthenium* shows higher antimicrobial against *Staphylococcus aureus* and *Lactobacillus sporogens* 12.66 and 09mm respectively.

In pesticidal activity the ethanol extract of *p.* Extract of *P. hysterophorus* shows significant lethal effect against *Tribolium sp.* and *Oryzaephilus sp.* The 50% lethal effect shows at a 6% conc. in a root and stem extracts. While in a root extract it's at 8% concentration.

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