



**“PHYTOCHEMICAL ANALYSIS OF XANTHIUM STRUMARIUM LINN.”**

## **Project Report**

Under

DBT Star College Scheme

Department of Biotechnology, New Delhi

By

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Submitted to

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## **Certificate**

This is to certify that the work incorporated in the project report on "Phytochemical analysis of *Xanthium strumarium* Linn." by *Miss. Kadam Mayuri Ashok, Miss. Dhere Vaishnavi Prakash, Mr. Bhusari Abhay Ravsaheb, Mr. Rashinkar Rahul Balasaheb* are students of Arts, Commerce and Science College Sonai, Tal. Newasa, Dist. Ahmednagar. Affiliated to the Savitribai Phule Pune University Pune successfully completed project.

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## Declaration

We hereby declare that the work done in this thesis entitled "Phytochemical analysis of *Xanthium strumarium* Linn." is submitted to Department of Botany, Arts, Commerce and Science College Sonai. This project is completed under the DBTStar College Scheme and the supervision of **Prof. K.B. Arangale**. The work is original and not submitted in part or full by me or any other to this or any other University.

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## INTRODUCTION:

Medicinal plants are of great value in the field of treatment and cure of diseases. Over the years, scientific research has expanded our knowledge of the chemical effects and composition of the active constituents, which determine the medicinal properties of the plants. It has now been a universally accepted fact that the plant drugs and remedies are far safer than of synthetic medicines (Jain, 1991). The importance of plants is known to us well. The plant kingdom is a treasure house of potential drugs and in the recent years there has been an increasing awareness about the importance of medicinal plants. Drugs from the plants are easily available, less expensive, safe, and efficient and rarely have side effects. Human beings have been utilizing plants for basic preventive and curative health care since time immemorial. Plant extracts or bioactive herbal compounds have been reported scientifically for their biological activities. Phytochemicals may protect human from a host of diseases. Phytochemicals are non-nutritive plant chemicals that have protective or disease preventive properties. Plant produces these chemicals to protect itself but recent research demonstrates that many phytochemicals can protect humans against diseases. There are many phytochemicals in fruits and herbs and each works differently. *Xanthium strumarium* is a gregarious weed found abundantly throughout India.

*Xanthium strumarium* is an annual herb with a short, stout, hairy stem. Leaves are broadly triangular-ovate or suborbicular. It commonly grows in waste places, along with roadsides and river banks. The plant's component xanthinin shows antibacterial activity. It resembles sunflower oil and used in bladder infection, herpes, and erysipelas. The whole plant improves appetite, voice, complexion, and memory. It cures leucoderma, biliousness, and poisonous bites of insects, epilepsy, salivation, teeth diseases and fever. Roots are used in cancer, strumous diseases. Fruits are useful in headache. Seeds fumes are inhaled for piles (burnt). Chrysanthemum is a bushy herb, densely branching, 40-80cm in height. Leaves are deeply cut, toothed, pale greyish green. Many flowered stems, often semi-double. It grows fairly well when the seeds are sown in the fall (September to November), and in the spring.<sup>2</sup> Chrysanthemum flowers used to make medicine. It is used to treat high blood pressure, diabetes, chest pain, cough, cold, fever and inflammation.( Agharkar, 1991, Byczynsky, 1997, Liptay and Tu, 2003, Sharma and Arora, 2006)

Fructus Xanthii, are used in China for the treatment of nasal sinusitis, headache caused by wind-cold, urticaria, and arthritis. The chemical composition

of ent-kaurane diterpenoids, sesquiterpene lactones, caffeoylquinic acids, and a thiazinedione from this plant (leaves or fruits) have been reported. The plant has wide array for various ailments such as anti-diabetes and anti-oxidation, antibacterial antiviral, antibacterial, insecticidal, herbicidal and antitrypanosomal. The qualitative analysis of phytochemicals encompasses steroids, alkaloids, flavonoids, triterpenoids, tannins, saponins, quinone, coumarin, protein, sugar and gum. The study such as ethno medicine keenly represents one of the best avenues in searching new economic plants for medicine.

- Domain: Eukaryota
- Kingdom: Plantae
- Phylum: Spermatophyta
- Subphylum: Angiospermae
- Class: Dicotyledonae
- Order: Asterales
- Family: Asteraceae
- Genus: *Xanthium*
- Species: *Xanthium strumarium* Linn.

## **MATERIALS AND METHODS**

### **Plant material**

Fresh plants were collected from Sonai Tal. Newasa Dist. Ahmednagar (M.S.) India The plant *Xanthium strumarium* Linn. It was identified and authenticated at Department of Botany, MES, Arts, Commerce and Science College Sonai (Maharashtra). The leaves were separated from the plant washed, and shade dried then milled in to fine powder be a mechanical grinder.

### **Preparation of extract**

**Preparation of aqueous plant extracts:** The plant material was wash tap water remove soil and dust particles and then dry in shady place temperature ( $25 \pm 2^\circ\text{C}$ ). Plants leaves were crush in mixture and to make fine powder. Fifty grams of leaves powder was crush in 50ml of sterile distilled water using mortar and pestle. The extracts were filter double layered cheese cloth, and then through Whatman filter paper No.1. The Filter extracts centrifuged at 5000 rpm for 20 minutes supernatant was stored in sterilized bottle and labeled properly. Finally the filtrate was passed through syringe filter of 0.2  $\mu\text{m}$  pore size for sterilization. The standard solution was stored at  $4^\circ\text{C}$  for further use [Kulshrestha *et.al.* 2015].

**Preparation of ethanol /methanol plant extract:** Leaves of the plants were thoroughly washed and dried under shade at the room temperature ( $20 \pm 2^\circ\text{C}$ ). The dried leaves were then ground to a fine powder in an electric grinder. Stock solutions of the extract were prepared by adding ground leaf powder to 200 ml of each solvent (w/v, 1 g/ 10 ml). Methanol/ethanol solvents were used for extraction. Prepared extracts were then shaken for 6 hours for homogenous mixing of ground leaf powder in the solvent. After that each extract was passed through Whatman filter paper no.1. Final crude extract on a mini rotary evaporator under vacuum at  $20^\circ\text{C}$  and was utilized for the experiments [Edeoga *et al.* 2005].

**Phytochemical Analysis:** Phytochemical screening of ethyl acetate extract for the presence of these secondary metabolites: Alkaloids (Draggendorff's), flavonoids (Shibat'as reaction), Saponins (Frothing test), tannins (5% ferric chloride), Terpenoids (2, 4-dinitro-phenyl hydrazine), glycosides (fehling's solution), steroids (Liebermann's Burchard test) were evaluated according to the methods described by Edeoga *et al.* 2005.



## RESULT AND DISCUSSION:

The phytochemical analysis of Ethanol extract shows the presence of Alkaloids, Flavonoids, Tannin, Saponins Terpenoids, Glycosides and Steroids. Methanol extract shows the presence of Alkaloids, Flavonoids, Tannin, Saponins and Glycosides. Aqueous extract had showed the presence of Alkaloids, Flavonoids, Tannin and Saponins. In previous findings flavonoids were found to be effective antimicrobial substances against a wide range of microorganisms, probably due to their ability to form a complex with extra cellular, soluble protein and bacterial cell wall: In addition more lipophilic flavonoids may also disrupt microbial membrane. Secondary metabolites of plant origin appear to be one of the alternatives for the control of these antibiotic resistant human pathogens. The most important of their bioactive compounds of plants are such as alkaloids, flavonoids, tannins and phenolic compounds. This antibacterial activity may be due to the presence of secondary metabolites.

**Table 2: Phytochemical analysis of different solvent extracts of *V. negundo* Linn.**

Plants	Extract	Alkaloids	Flavonoids	Tannin	Saponins	Terpenoids	Glycosides	Steroids
<i>Vitex negundo</i> Linn.	Ethanol	+	+	+	+	+	+	+
	Methanol	+	+	+	+	-	+	-
	Aqueous	+	+	+	+	-	-	-

**CONCLUSION:**

The present study showed the phytochemical analysis the leaves of *Xanthium strumarium* Linn. Pharmacognostical studies like physicochemical analysis of leaf of *Xanthium strumarium* Linn. Provides valuable information to the identification and authentication of this plant materials. Preliminary phytochemical investigation of the phytochemical analysis of Ethanol extract shows the presence of Alkaloids, Flavonoids, Tannin, Saponins Terpenoids, Glycosides and Steroids. Methanol extract shows the presence of Alkaloids, Flavonoids, Tannin, Saponins and Glycosides. Aqueous extract had showed the presence of Alkaloids, Flavonoids, Tannin and Saponins.

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