



(RESEARCH ARTICLE)



Phytochemical studies of *Xanthium Strumarium L* leaves from Tisgaon (PIN Code 431002) of Taluka and District Aurangabad, India

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Abstract

Xanthium Strumarium L. (Family: Compositae) is a cocklebur or burweed oftentimes located as a weed in roadsides, rice fields, and hedges all through the tropical components of India. The phrase “xanthium” is derived from an ancient Greek word “Xanthos” which means yellow and “Strumarium” capability “cushion like swelling,” regarding the seedpods which flip from inexperienced to yellow as they ripen (later they come to be deep yellow to brown). It is regularly known as Chota gokhru due to the shape of its fruit which looks like the cow’s toe. In many components of India, it is acknowledged as adhasisi, as this weed is used for the remedy of the common disease hemicrania. The genus *Xanthium* consists of 25 species, all American origin. *Xanthium Spinosum Linn.* and *X. Strumarium Linn.* are used medicinally in Europe, North America, and Brazil, *Xanthium Canadensis Mill.* is used in North America and Brazil and *X. Strumarium Linn.* in China, India, and Malaysia. *Xanthium Strumarium L.* showed antioxidant, anti-inflammatory, anti-cancer activities as well as various medicinal significances hence it created sufficient interest to investigate phytochemical studies of leaves of *Xanthium Strumarium L.* of Tisgaon (PIN Code 431002) of Taluka and District Aurangabad, India which is hither to unknown from this region. Recently phytochemical studies of leaves of *Xanthium Strumarium L.* of Tisgaon were successfully carried out and the present work deals with the qualitative analysis and identification of elements, trace elements and organic moieties present in *Xanthium Strumarium L.* During this study it is investigated that the leaves of *Xanthium Strumarium L.* contain sodium, potassium, calcium, chloride, nitrate, phosphate, fluoride, bicarbonate along with terpenoids, coumarins, steroids, glycosides, flavonoids, thiazides, anthraquinones, naphthoquinones, polyphenols and alkaloids.

Keywords: *Xanthium Strumarium L.*; Phytochemical studies; Qualitative analysis

1. Introduction

Aurangabad is one of the oldest historical cities in Maharashtra state of India having rich flora and fauna of natural products. *X. Strumarium L.* is an annual herb, up to 1 m in height, with a short, stout, hairy stem and frequently grows in waste places, roadsides, and along riverbanks in warmer parts. Leaves widely alternate are triangular-ovate or sub orbicular, mild and shiny inexperienced in an alternate sample with irregular lobes and tremendously inconspicuous teeth, 5–15 cm long, regularly three-lobed, with distinguished veins, long petiole, scabrous on each side. Stems are spherical or slightly ribbed, regularly speckled. *Xanthium Strumarium L.* is traditional herbal medicine and extensively used to treat diseases¹⁻⁸ viz. bacterial, fungal, urticaria and rheumatism infections as well as for the treatment of arthritis, rhinitis, nasal sinusitis, headache, gastric ulcer, malaria, cancer, leprosy and vitiligo. As a wider program of this laboratory on natural products; various phytochemical investigations of different plants of various regions have been investigated in sufficient details⁹⁻¹³. Considering all these facts it was thought interesting to investigate phytochemical constituents present in leaves of *Xanthium Strumarium L.* of Tisgaon (PIN Code 431002) of Taluka and District Aurangabad, India.

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2. Material and methods

All chemicals used during the research work were of A.R. grade. Freshly prepared solutions were used throughout the research work. The solvents were purified by known literature methods.

2.1. Sample Preparation

The plants were collected from farms of Tisgaon of Taluka and District Aurangabad, India in May 2023. The plants were cut along with the stem and shade dried. Dried leaves were taken in mortar pestle and crushed to prepare fine powder. This fine powder is used for phytochemical studies by known literature methods¹⁴⁻¹⁶.

3. Results and discussion

3.1. Determination of Calcium

Sample was taken and kept in furnace at 500 °C for 10 hours then there is formation of ash. The ash was transferred into conical flask to it 20% HCl was added, the reaction mixture was continuously shaken vigorously for 1 hour and was filtered. The filtrate was taken for the determination of Ca. Qualitative analysis was carried out by given literature method and result is given in the table below.

3.2. Determination of Na and K elements

Sample was taken I silica crucible and kept in furnace at 500 °C for 10 hours then there is formation of ash. The ash was transferred into conical flask to it 20% HNO₃ was added; the reaction mixture was continuously shaken vigorously for 1 hour and was filtered. The filtrate was taken to determine Na and K. Qualitative analysis was carried out by flame tests with given literature method and result is given in the **Table No-1**.

Table 1 Elements obtained in Leaves of *Xanthium Strumarium L*

Sr. No	Element/compound	Test	Result
1	Calcium	+ve	Present
2	Sodium	+ve	Present
3	Potassium	+ve	Present
4	Chloride	+ve	Present
5	Fluoride	+ve	Present
6	Phosphate	+ve	Present
7	Bicarbonate	+ve	Present
8	Terpenoids	+ve	Present
9	Coumarin	+ve	Present
10	Alkaloids	+ve	Present
11	Steroids	+ve	Present
12	Flavonoids	+ve	Present
13	Glucosides	+ve	Present
14	Anthraquinones	+ve	Present
15	Naphthoquinones	+ve	Present

3.3. Test for Coumarin

Sample was taken in test tube to it few drop of 10% NaOH was added, yellow color appeared which confirmed the presence of coumarin.

3.4. Test for Alkaloids

Sample was refluxed with acetic acid in ethanol and was concentrated, cooled in water bath. It was filtered and to filtrate Mayer's reagent was added, grey colour was obtained which confirmed the presence of alkaloids.

3.5. Test for Flavonoids

Sample of stock solution was taken in a test tube and to it few drops of dilute NaOH solution was added intense yellow color was developed which became colorless when on few drops of dilute acid was added which indicated the presence of flavonoids.

Similarly, determination of chloride, nitrate, phosphate, fluoride, bicarbonate along with terpenoids, coumarins, steroids, glycosides, flavonoids, thiazides, anthraquinones, naphthoquinones and polyphenols were carried out by known literature methods¹⁷⁻²⁰.

4. Conclusion

The result showed that, the leaves of *Xanthium Strumarium L* contain sodium, potassium, calcium, chloride, nitrate, phosphate, fluoride, bicarbonate along with terpenoids, coumarins, steroids, glycosides, flavonoids, thiazides, anthraquinones, naphthoquinones, polyphenols and alkaloids.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no known financial or personal conflicts that would have appeared to have an impact on the research presented in this study.

References

- [1] Masvingwe. C., Mavenyengwa. M. Toxicological evaluation of the plant *Xanthium strumarium* in Pigs in Zimbabwe. *J Venom AnimToxins* 1998, 4, 2.
- [2] Chopra. R.N, Nayar. S.L, Chopra I.C. Glossary of Indian Medicinal Plants. New Delhi: Council of Scientific and Industrial Research; 1986, 259.
- [3] Moerman. D. Native American Ethnobotany. Oregon: Timber Press; 1998, 9.
- [4] Foster. S., Duke.J.A. A field Guide to Medicinal Plants. Eastern and Central N. America: Houghton Mifflin Co., 1990, 12
- [5] Singh. G., Kachroo. P. Forest Flora of Srinagar, A good flora of the western Himalayas but poorly illustrated, some information on plant uses, 1976.
- [6] Kirtikar. K.R, Basu.B.D. Indian Medicinal Plants. Basu LM press,Allahabad, India. 1981: Edition 2nd, Vol.2, 1355.
- [7] Chopra. R.N, Nayar. S.L, Chopra.I.C. Glossary of Indian Medicinal Plants. New Delhi: Council of Scientific and Industrial Research; 1958, 438.
- [8] Shivpuri. D. N, Dua. K.L. Studies in pollen allergy in Delhi area IV clinical investigation, *Indian J Med Res*, 1963, 51, 68.
- [9] Tayade.D. T, Shaikh R S, Patil S U. *J. of Indian Chem Soc.*, 83, 1-3 (2006).
- [10] Shaikh. R. S, Ph. D. Thesis, Amravati University, Amravati. (2006).

- [11] Tayade. D. T, Shaikh R S, Asian J. of Chemistry”, 15, (3, 4), 1851-52 (2003).
- [12] Tayade.D. T, Shaikh R S, Indian J. applied and pure biology, 18 (2),115-157 (2003).
- [13] Naskari P N, M. Phil Dissertation, Alagappa University, Karaikudi, (2007)
- [14] M. Hiruy M, Bisrat D, Asres K, Natural Product Resources, 10, 1052-1056 (2021).
- [15] Dong. X, Zeng Y, Liu Y, Phytotherapy Research, 34, 270-281 (2021).
- [16] Ouidir. T, Gabriel. B, Journal of Biotechnology, 350, 67-74 (2022).
- [17] Mann F G, Saunders B.C., Practical Organic Chemistry, 2009 ,th Edition4 ,Pearson Education India
- [18] Svehla G., Sivasankar B., Vogel's Qualitative Inorganic Analysis, Pearson Education India, 7th Edition, 2012
- [19] Agrawal O.P., Advance Practical Organic Chemistry, Krishna's Education Publication, 2nd Edition, 2015
- [20] Vishnoi N.K., Advanced Practical Organic Chemistry, S. Chand Publication, 3rd Edition, 2010.