



Preliminary Phytochemical Analysis of *Typha domingensis* Rhizome Aqueous Extracts.

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ABSTRACT

Typha domingensis is a luxuriantly and dominant growing plant in marshy and water logged areas occupying large areas. It is understood to inhibit the growth of other aquatic plants thus becoming the major habitation in any area that it grows. The present study was to ascertain the phyto chemical analysis of the ethyl acetate extract of rhizome. The study has indicated the presence of reducing sugars, steroids, cardiac glycosides and the absence of saponins, tannins and flavonoids.

Keywords: *Typha domingensis*, Ethyl Acetate, Saponins, Tannins, Reducing sugars, Flavonoids

INTRODUCTION

Typha domingensis also known as Cat tail, is known to inhibit the growth of other flora around itself thus prompting research to find out the reasons whether any phyto-chemicals which might come out of the roots stopping the growth of other plants. It was reported that some phytotoxins are released which inhibit the germination of other plants in aquatic medium surround it.¹ Some other researchers have also found that this root extracts does inhibit algae, Hydra and other species. In order to further clarify the mode of action of cattail-derived substances on ecological targets Maria investigated the cellular effects after exposing germinating roots to cattail extracts and further microscopy studies have been a very useful tool to elucidate the mode of action of natural toxins at the cellular level. In the present report the phytochemical analysis of the rhizome was undertaken.²

The *Typha domingensis pers.* (*T. domingensis*) also known as Cattail, is a member of the typhaceae family. These plants are herbaceous, rhizomatous perennial plants with long, slender green stalks topped with brown, fluffy, sausage-shaped flowering heads 15-40 dm tall.

The spike is bright yellow-to-orange-brown. The basal leaves are 6-18 mm wide when fresh, 5-15 mm wide when dry. Typhaceae family is common in the warm temperature and tropical regions of the world always found in or near water, in marshes, ponds, lakes and depressions.

Typha domingensis used externally for burns and wound healing, leaves are diuretic.^{3,4} The family Typhaceae have one genus and 10 to 15 species. The characteristic inflorescence gives the family the common name 'cat tails'. Individuals are tall and can reproduce clonally, by submerged rhizomes, forming dense stands. The leaves are diuretic and the pollen is astringent, desiccant, diuretic, haemostatic and vulnerary.⁵ Pollen is used in the

treatment of nose bleeds, haematemesis, haematuria, uterine bleeding, dysmenorrhoea, postpartum abdominal pain and gastralgia, scrofula and abscesses. It is also contraindicated for pregnant women.⁶ The rootstock is astringent and diuretic.⁷ It was reported that *Typha angustifolia* (Watt) syn. *Typha elephantine* (Roxb) and *Typha latifolia* (Edgew) are used as the sources of antimycobacterial agent in India.⁸

The use of medicinal plants for their curative properties is a time tested experience of humans. Some of the phytochemicals like tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids have therapeutic values.⁹ The knowledge of these phytoconstituents is very helpful in drug discovery and new drug molecule formulation.¹⁰⁻¹³

MATERIALS AND METHODS

Collection of samples

The medicinal plants used for the experiment were whole plants of *T. domingensis* collected from the nearby marshy areas near Sholinganallur, Chennai (Figure 1). The plants were identified and a herbarium is deposited at Sidha central research Institute at Chennai, India, and authenticated by Dr. Sasikala, Scientist.



Figure 1: *T. domingensis*



Preparation of extracts

30 grams of dried powder of *Typha domingensis* rhizome was packed in separate round bottom flask for sample extraction using ethyl acetate as solvent. The extraction was conducted by 500 ml of the solvent for a period of 96 hours. The extract was separated from the plant mass and filtered. The solvent was evaporated by gentle heating in a water bath at 50°C. The resultant semi dried extract was collected and stored for further experiment in refrigerator.

Phytochemical analysis

The extracts prepared was dissolved in distilled water and homogenised by shaking analyzed for the presence of alkaloids, saponins, tannins, steroids, flavonoids, anthraquinones, triterpenoids, cardiac glycosides, Amino acids, and sugars based on the protocols available in the literature.^{14,15}

Test for alkaloids

The extract of the crude dry leaf powder of each solvent was evaporated to dryness in boiling water bath. The residues were dissolved in 2 N Hydrochloric acids. The mixture was filtered and the filtrate was divided into three equal portions.

One portion was treated with a few drops of Mayer's reagent, one portion was treated with equal amount of Dragendorff's reagent and the third portion was treated with equal amount of Wagner's reagent respectively.

The appearance of creamy precipitate, the orange precipitate and brown precipitate indicated the presence of respective alkaloids.

Test for saponins

About 0.5 g of the plant leaf extract was vigorously shaken with water in a test tube and then heated to boil. Frothing was observed which was taken as a preliminary evidence for the presence of the saponins.

Test for tannins

About 0.5 g of plant leaf extract was added was in 10 ml of water in a test tube and filtered. A few drops of 0.1% ferric chloride was added and observed for brownish green or blue-black coloration.

Test for steroids

2 ml of acetic anhydride was added to 2 ml of plant leaf extract of each sample along with 2 ml sulphuric acid. The colour changed from violet to blue or green in some samples indicating the presence of steroids.

Test for flavonoids

2 ml of extract solution was treated with 1.5 ml of 50% methanol solution. The solution was warmed and metal magnesium was added. To this solution few drops of conc. Hydrochloric acid was added and the red colour was observed for flavonoids and orange colour for flavones.

Test for Anthraquinones

About 0.5 g of extract was taken in a dry test tube and 5 ml of chloroform was added and shaken for 5 min. The extract was filtered and the filtrate shaken with equal volume of 10% of ammonia solution. A pink violet or red colour in the ammoniacal layer indicates the presence of anthraquinones.

Test for cardiac glycosides

0.2 g of extract was dissolved in 1 ml of glacial acetic acid containing 1 drop of ferric chloride solution. This was then under layered with 1ml of concentrated sulphuric acid. A brown ring obtained at the interface indicated the presence of a deoxy-sugar characteristic of cardioids.

Test for amino acids

To 2ml of protein solution 1ml of 40% NaOH solution and 1 to 2 drops of 1% CuSO₄ solution was added. A violet colour indicated the presence of peptide linkage of the molecule.

Test for Tri-Terpenoids

5ml of each extract was added to 2ml of chloroform and 3ml of con. H₂SO₄ to form a monolayer of reddish brown coloration of the interface was showed to form positive result for the tri-terpenoids.

RESULTS AND DISCUSSION

The preliminary study of the various phytochemicals present in the ethyl acetate extraction of the plant, *Typha domingensis* is indicated in Table 1.

Table 1: Phytochemical analysis of ethyl acetate extract of rhizome of *Typha domingensis*.

S. No.	Phytochemicals	Inference
1	Saponins	-
2	Tannins	-
3	Triterpenoids	-
4	Reducing sugars	+
5	Steroids	+
6	Proteins	-
7	Cardiac glycosides	+
8	Anthroquinones	-
9	Flavonoids	-
10	Alkaloids	-

Present = +; Absent = -

Typha domingensis rhizome aqueous extracts contain phyto chemicals namely, sugars, steroids and cardiac glycosides. These results auger well with the knowledge that these rhizomes are eaten by the local people and it is sweet in taste.

The absence of most of the phyto chemicals like flavonoids, alkaloids, tannins, saponnis, anthroquinones,



amino acids, triterpenoids is significant since almost all were reported to be present in the leaf extract of the same plant.

This however could be justified since the physiology of the submerged rhizome and that of arial leaf could be significantly different.

It is concluded from the above discussion that *Typha domingensis* rhizome contains sugars, steroids and cardiac glycosides as was found in the phytochemical analysis.

Further work is on to prove the reasons for the different behaviour of the plant extract on the germination of gram seeds.

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