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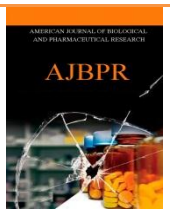


# SCREENING OF PRELIMINARY PHYTOCHEMICAL ANALYSIS OF *OXYSTELMA ESCULENTUM* R.BR.

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**ABSTRACT**

The preliminary phytochemical analysis of *Oxystelma esculentum* R.Br. was screened using four various solvent extracts such as methanol, chloroform, benzene and hexane. The preliminary phytochemical study was conducted by Harborne method. In the preliminary phytochemical analysis of *Oxystelma esculentum* R.Br., the presence of ten different types of secondary metabolites such as alkaloids, anthraquinones, catechins, flavonoids, glycosides, phenolic groups, reducing sugars, saponins, tannins and terpenoids were reported in the various extracts. From the observation, it was noted that the different extracts of *Oxystelma esculentum* R.Br. showed the presence of a number of active secondary metabolites. Hence the present report may lead to the isolation and characterization of these active secondary metabolites for bio-efficacy and bioactivity.

## INTRODUCTION

Man and animals depends on the plants for their very existence. The environment is characterized by richly diversified plant life. Plant diversity is composed of more than 5,00,000 botanical species. Plants constitute a vital component of the biodiversity as they play a key role in maintaining earth's environmental equilibrium and ecosystem stability. Herbal medicine is known to be the oldest form of healing. It was originated from ancient Greek as far back as 1600BC [1]. With Herbal Renaissance happening all over the globe, medicinal herbs are staging a phenomenal comeback. Ethnobotanical information from India estimated that more than 6000 higher plant species forming about 40% of the higher plant diversity are used in its codified and folk healthcare traditions [2].

In India, Ayurvedic system of medicine has existed for over four thousand years. From ancient literature it is evidence that the various parts of the plants were used in Siddha, Ayurveda and Unani medicines for the treatment of diseases of human being. Medicinal herbs are an important source for the therapeutic remedies of various ailments [3]. Since time immemorial, different parts of medicinal herbs have been used to cure specific ailments [4]. The leave decoction of *Carissa spinarum*, *Urtica dioica*, *Warburgia ugandensis*, *Senna didymobotrya*, *Physalis peruviana*, *Bidens pilosa*, *Leonotis nepetifolia* and *Toddalia asiatica*, were used for the treatment of diabetes, malaria and pneumonia [5]. Phytochemicals are non nutritive plant chemicals that have protective or disease preventive properties [6]. The plants produce these chemicals to protect themselves but recent research demonstrates that they can protect humans and animals against diseases [7]. Hence the present study was aimed to investigate the preliminary phytochemical analysis of *Oxystelma esculentum* R.Br.

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## MATERIALS AND METHODS

### Collection of plant materials

The plant material selected for the present study is *Oxystelma esculentum* R.Br. (Figure 1) belonging to the family Asclepiadaceae which was collected near new bus stand, Tirunelveli, Tamil Nadu, India, during the month of December, 2015 and identified and confirmed by the flora of the Presidency of Madras (Gamble, 1919). The collected materials were washed thoroughly with tap water to remove the sediment particles. Then the samples were brought in polythene bag to the laboratory, followed by washed using distilled water. They were stored in refrigerator for further use.

### Preliminary phytochemical analysis

The different extracts (methanol, chloroform, benzene and hexane) of *Oxystelma esculentum* R.Br. were tested for alkaloids, anthraquinones, catechin, flavonoids, glycosides, phenolic groups, reducing sugars, saponins, tannins and terpenoids. Phytochemical screening of the extracts was carried out according to the standard methods [8].

### Preparation of extracts

For the preparation of different extracts, the plant specimens were washed thoroughly and placed on blotting paper and spread out at room temperature in the shade condition for drying. The shade dried samples were grounded to fine powder using a tissue blender. The powdered samples were then stored in the refrigerator for further use. 30g powdered samples were packed in Soxhlet apparatus and extracted with methanol, chloroform, benzene and hexane for 8h separately.

### Test for alkaloids

1ml of 1% HCl was added to the 2ml of extract in a test tube and was treated with few drops of Mayer's reagent. A creamy white precipitate indicates the presence of alkaloids.

### Test for anthraquinones

2ml extract was mixed with benzene and 1ml 10% ammonia solution was added. The presence of a pink, red or violet color indicates the anthraquinones.

### Test for catechin

2ml extract was mixed with Enrlich reagent and few drops of Conc. HCl. Formation of pink colour indicates the presence of catechin.

### Test for flavonoids

A few drops of 1% $NH_3$ solution was added to 2 ml of extract in a test tube. A yellow Coloration indicates the presence of flavonoids.

### Test for glycosides

2ml of 50% $H_2SO_4$ was added to the 2ml of extract in a boiling tube. The mixture was heated in boiling water bath for 5 min. 10ml of Fehling's solution was added and boiled. A brick red precipitate indicates the presence of glycosides.

### Test for phenolic groups

To 1ml extract, add 2ml distilled water followed by few drops of 10% Ferric chloride. The formation of blue or black colour indicates the presence phenolic groups.

### Test for reducing sugars

5-8 drops Fehling's solution was added to 2ml extract. The mixture was heated in boiling water bath for 5 min. A red-brick precipitate shows the presence of reducing sugars.

### Test for saponins

2ml of extract was shaken vigorously with 5ml distilled water to obtain stable persistent foam. The formation of emulsion indicates the presence of saponins.

### Test for tannins

To 2ml extract, 1ml of distilled water and 1-2 drops of ferric chloride solution was added and observed for brownish green or a blue black coloration indicates the presence of tannins.

### Test for terpenoids

2ml extract was mixed with 2ml of $CHCl_3$ in a test tube. 3ml conc. $H_2SO_4$ was carefully added along the wall of the test tube to form a layer. An interface with a reddish brown coloration confirms the presence of terpenoids.

## RESULTS AND DISCUSSION

Plants are now occupying important position in allopathic medicine, herbal medicine, homoeopathy and aromatherapy. Medicinal plants are the sources of many important drugs of the modern world. Many of these indigenous medicinal plants are used as spices and food plants; they are also sometimes added to foods meant for pregnant mothers for medicinal purposes. Many plants are cheaper and more accessible to most people especially in the developing countries than orthodox medicine, and there is lower incidence of adverse effects after use. These reasons might account for their worldwide attention and use. The medicinal properties of some plants have been documented by some researchers.

In the preliminary phytochemical analysis of *Oxystelma esculentum* R.Br., ten different types of secondary metabolites (alkaloids, anthraquinones, catechins, flavonoids, glycosides, phenolic groups, reducing sugars, saponins, tannins and terpenoids) were

tested in four different extracts of *Oxystelma esculentum* absence of the above compounds, 27 tests gave positive results and the remaining gave negative results.

The 27 positive results showed the presence of alkaloids, catechin, flavonoids, glycosides, phenolic groups, reducing sugars, saponins, tannins and terpenoids. Flavonoids and terpenoids show the maximum presence, being found in four different extracts and alkaloids, catechin, reducing sugars, saponins and tannins in three R.Br. Thus, out of (1x4x10) 40 tests for the presence or extracts followed by glycosides and phenolic groups found in only two extracts. Among the four different extracts, the methanol and chloroform extracts showed the presence of the maximum number (8) of compounds. Next to methanol and chloroform extract, benzene extract showed the presence of seven compounds and the hexane extract showed the presence of four compounds (Table 1).

**Table 1. Preliminary phytochemical analysis of different solvent extracts of *Oxystelma esculentum* R.Br.**

| Compound | Methanol | Chloroform | Benzene | Hexane |
|---|---|---|---|---|
| **Alkaloids** | + | + | + | - |
| **Anthraquinones** | - | - | - | - |
| **Catechin** | + | + | + | - |
| **Flavonoids** | + | + | + | + |
| **Glycosides** | + | - | + | - |
| **Phenolic groups** | + | + | - | - |
| **Reducing sugars** | + | + | + | - |
| **Saponins** | - | + | + | + |
| **Tannins** | + | + | - | + |
| **Terpenoids** | + | + | + | + |

**Figure 1. Natural habit of *Oxystelma esculentum* R.Br**

## CONCLUSION

From the present results, it could be concluded that *Oxystelma esculentum* R.Br. was noted to be the presence of a number of active secondary metabolites namely alkaloids, anthraquinones, catechins, flavonoids, glycosides, phenolic groups, reducing sugars, saponins, tannins and terpenoids. Among the four different extracts, the methanol and chloroform extracts showed the presence of the maximum number (8) of compounds. Next to methanol and chloroform extracts, benzene extract showed the presence of seven compounds and the hexane extract showed the presence of four compounds. This piece of report can lead to the isolation and characterization of the active secondary metabolites for bioefficacy and bioactivity.

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