

## Preliminary Phytochemical Screening of Leaves of *Ocimum tenuiflorum*

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Doi-10.51129/ujpah-june2021-30-1(9)

**Abstract**-The medicinal plants are useful for healing and curing of human diseases. Over 55% of all modern clinical drugs are of natural product origin. The plant, *Ocimum tenuiflorum* is highly used by the people of whole world specially Indians to cure various disorders because of the presence of phytochemical constituents. *Ocimum tenuiflorum* plant is known to possess anticancer, antispasmodic, antiviral, insecticide, antiseptic, analgesic, anti-inflammatory, antimicrobial, antistress, Immunomodulatory, hypotensive and antioxidant properties. The present study reveals that various secondary metabolites such as glycosides, alkaloids, flavonoids, phenols, terpenoids, tannins, saponins, antraquinone, fats and oils and steroids are present in different leaf extract of the plant.

**Keywords:** *Ocimum tenuiflorum*, secondary metabolites, clinical drug

### Introduction

Medicinal plants are rich source of different types of medicines and produce various bioactive molecules. (Nostro et al, 2000). Herbal plant extracts are very useful and are the major sources of medicine which play vital role in control various type of pathogens (Doss, 2009). Plants are vital for the wellbeing of humankind in a variety of ways. Some plant extracts contain antimicrobial properties that can treat different pathogens. Most of the population of whole world relies on medicinal plants and natural products for their primary health care needs.

Phytochemicals are chemical compounds produced by plants, generally to help them resist fungi, bacteria and plant virus infections, and also consumption by insects and other

animals. Phytochemicals are primary and secondary compounds. Chlorophyll, proteins and common sugars are included in primary constituents and secondary compounds have terpenoid, alkaloids and phenolic compounds, steroids flavonoids, tannin etc. (Krishnaiah et al, 2007)

*Ocimum tenuiflorum* (synonym *Ocimum sanctum*), commonly known as holy basil or Shyama Tulsi, is an aromatic perennial plant in the family Lamiaceae. Tulsi has been used for thousands of years for its diverse healing properties and is regarded in Ayurveda as the "Elixir of life" that promotes longevity. (Gupta et al, 2002) Tulsi also known as "The Queen of herbs", the legendary 'Incomparable one' of India, is one of the holiest and most cherished of the many healing and healthy giving herbs of the orient. The sacred basil, Tulsi, is renowned for its religious and spiritual sanctity, as well as for its important role in the traditional Ayurvedic, Naturopathy and Unani system of holistic health and herbal medicine. It is mentioned by Charaka in the Charaka Samhita; an Ayurvedic text (Warrier, 1995). Scientific studies have shown that Krishana Tulsi possess antiinflammatory, analgesic, antipyretic, antidiabetic, hepatoprotective, hypolipidemic, antistress, and immunomodulatory activities. (Manjeshwar et al, 2013).

### Material and Methods

**Collection of Sample:** The plant *Ocimum tenuiflorum* were collected from the local plant nursery (Rama Nursery, Muzaffarnagar) and identified by the Professor S. Kumar (Head, Department of Botany, D.A.V.College, Muzaffarnagar. The leaves were cleaned and washed in sterile distilled water and air dried at

room temperature. The dried leaves were powdered using blender.

**Preparation of leaf Extracts:** 10 gram of powdered leaves of *Ocimum tenuiflorum* were weighed and mixed with 100 ml of six different solvents (methanol, ethanol, acetone, chloroform, diethyl ether and distilled water) in conical flasks and kept in rotatory shaker at 150 rpm for 24 hours. After 24 hours it was filtered with Whatman No.1 filter paper. The filtrates were evaporated in a hot air oven at 50°C until dry. One gram dried extracts were resuspended in 10 ml of Dimethyl Sulphoxide (DMSO) individually. The extracts were stored in sample bottles at 4°C prior to use. (Jyothi Prabha and Venkatachalam, 2016; Borah and Biswas, 2018).

**Qualitative Detection of Phytochemical Constituents:** Detection of active phytochemical constituents was carried out for all the extracts using the standard procedures:-

**Screening of Alkaloids (Mayer's Test)**

**Mayer's Test:** Filtrates were treated with Mayer's reagent (Potassium Mercuric Iodide). Formation of a yellow colored precipitate indicates the presence of alkaloids.

**Wagner's Test:** Filtrates were treated with Wagner's reagent (Iodine in Potassium Iodide). Formation of brown/reddish precipitate indicates the presence of alkaloids.

**Screening of Phenol**

**Ferric chloride test:** About 2ml plant extract was taken to water and warmed at 50°C. Then 2 ml of 0.3%  $\text{FeCl}_3$  was added. Formation of green or blue color indicates the presence of phenols.

**Screening of glycosides (Keller Kiliani Test)**

5ml of each extract was added with 2ml of glacial acetic acid which was followed by the addition of few drops of ferric chloride solution and 1ml of concentrated Sulphuric acid. Formation of brown ring at interface confirms the presence of glycosides.

**Screening of Terpenoids (Salkowski Test)**

5ml of extract was taken in a test tube and 2ml of chloroform was added to it followed by the addition of 3ml of concentrated sulphuric acid. Formation of reddish brown layer at the junction of two solutions confirms the presence of terpenoids.

**Screening of Flavonoids (Alkaline Reagent Test)**

**NaOH test:** 2ml of extracts was treated with few drops of 20% sodium hydroxide solution formation of intense yellow colour, which becomes colourless on addition of dilute hydrochloric acid, indicates the presence of flavonoids.

**$\text{H}_2\text{SO}_4$  test:** A fraction of the extract was treated with Conc.  $\text{H}_2\text{SO}_4$  and observed for the formation of orange color.

**Screening of Saponins**

**Foam test:** 2ml of extract was taken in a test tube and 6ml of distilled water was added to it. The mixture was shaken vigorously and observed for the formation of persistent foam that confirms the presence of saponins.

**Screening of Steroids**

1ml of extract was dissolved in 10ml of chloroform and equal volume of concentrated sulphuric acid was added by the sides of the test tube. The upper layer turns red and sulphuric acid layer showed yellow with green fluorescence. This indicates the presence of steroids.

**Screening of Tannins**

**Lead acetate test:** Few drops of 1% lead acetate was added in to 2ml of extract. A yellowish precipitate indicated the presence of tannins.

**Ferric chloride test:** 0.5g of the dried powdered sample was boiled in 20ml of water in a test tube and then filtered. A few drops of 0.1%  $\text{FeCl}_3$  was added and observed for brownish green-black or a blue-black coloration.

**Screening of Anthraquinone**

5ml of chloroform and 5 ml of ammonia solution was added to 0.2 gm of plant extract. Appearance of pink, red or violet colour indicated the presence of anthraquinone.

**Screening of Oils and Fats**

A small quantity of crude extract was pressed between two filter papers separately. An oily appearance on filter paper indicated the presence of fixed oil and fats.

**Results and Discussion**

The preliminary phytochemicals screening of different extracts showed that the most important types of phytochemicals found in the leaves of *Ocimum tenuiflorum* are glycosides,

alkaloids, anthraquinone, flavonoids, phenols, terpenoids, tannins, saponins, fats and oil and steroids positively detected in all the extract during phytochemical confirmation. Results

indicated that the leaves extract prepared in D.W., ethanol and methanol have all the important phytochemical and have great potential to act as a source of drug. Results shown in the Table.

Table- Preliminary Phytochemical Screening of leaves of *Ocimum tenuiflorum* in different extracts

S.NO	Phytochemicals	D.W	Diethylether	Ethanol	Acetone	Methanol	Chloroform
1	Tannins	+	+	+	+	+	+
2	Flavonoids	+	-	+	+	+	+
3	Saponin	+	+	+	-	+	-
4	Glycosides	+	+	+	-	+	+
5	Terpenoids	+	+	+	+	+	+
6	Steroids	+	-	+	+	+	+
7	Phenols	+	+	+	+	+	+
8	Anthraquinone	+	-	+	+	+	-
9	Alkaloids	+	+	+	+	+	+
10	Fats and oil	+	+	-	-	-	+

'+' indicates presence of compound; '-' indicates absence of compound

The herbs, plant extract and their phytoconstituents have been reported for anti-inflammatory, anti diarrheal, antimicrobial, antioxidant and insecticidal activities (Chouhan and Singh, 2011). Alkaloids have important biological property like cytotoxicity and are used in allopathic systems (Trease and Evans, 2005). The glycosides are useful in lowering blood pressure. (Nyarko and Addy, 1990). Terpenoids are used in the treatment of cough, asthma and hay fever. (Amin *et al*, 2013). Saponin have been extensively used as detergents and pesticides, in addition to their industrial applications as foaming and surface active agents and also beneficial health effects (Shi *et al*, 2004). Phenols and tannins acts as antioxidants (Han *et al*, 2005).

## Conclusion

The present study concluded that the leaves of medicinal plant, *Ocimum tenuiflorum* are rich source of the secondary metabolites and have the potential to act as a source of useful drugs because of the presence of various phytochemical contents. These contents are useful and improve the health of human being.

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