**A review on herbal monograph preparation:Tulsi**

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**Abstract**:

A monograph is a comprehensive document, often in the form of a book or pamphlet, that provides scientific information on the safety, efficacy, and quality control of widely used medicinal plants. Through monographs, we study the present status and standards of herbal plants, covering aspects such as synonyms, biological sources, family, chemical constituents, medicinal uses, and pharmacological actions. Tulsi, commonly known as the “Queen of Herbs,” is highly valued in Ayurveda and the Siddha system of medicine. All parts of the plant have therapeutic significance and are reportedly free from side effects. Also known as holy basil. The plant has a broad range of medicinal uses, including antidiabetic, anticancer, anti-inflammatory, antiviral, antifungal, antioxidant, anti-asthmatic, antipyretic, memory-enhancing, anticoagulant, and antiulcer activities.

**Keywords**: Holy basil, antioxidant, antifungal, antidiabetic

**Introduction**:

A monograph is a self-contained publication or a detailed written study focused on a single specialized subject or specific aspects within that field

**Monograph of Tulsi:**

* **Synonym**: holy basil
* **Botanical** name: *ocimum* *Sanctum*
* Family: Lamiaceae
* **Geographical distribution:**  In India, it is cultivated widely across the country, from the coastal regions of the Andaman and Nicobar Islands up to elevations of about 1800 meters in the Himalayas. Its adaptability to different climates has enabled it to grow in diverse regions beyond India, including Malaysia, Australia, West Africa, and certain Arab countries. This wide distribution is due to its cultural significance, medicinal properties, and ability to thrive in various environmental conditions.

Fig .1:- leaves of tulsi



**Organoleptic characteristics:**

**Table** **no 1: Organoleptic characteristics**

|  |  |
| --- | --- |
| **Parameter**  | **Observation**  |
| **Color**  | **Brownish, ash like**  |
| **Odor**  | **Characteristics**  |
| **Texture**  | **Hygroscopic**  |

**Taxonomical classification:**

**Table no 2: Taxonomical classification**

|  |  |
| --- | --- |
| **Kingdom**  | **Plantae** |
| **Class**  | **Magnoliospida**  |
| **Order**  | **Lamiales**  |
| **Family**  | **Lamiaceae**  |
| **Genus**  | **Ocimum**  |
| **Species**  | **Sanctum**  |

**Chemical constituents:**

**Table no 3 : essential oil obtained from Tulsi**

|  |  |
| --- | --- |
| **Essential oil**  | **Percentage**  |
| **Monoterpene**  | **95.8%** |
| **Camphor**  | **64.9%** |
| **Limonene**  | **8.7%** |
| **Camphene**  | **6.4%** |
| **( E )-Ociemene**  | **3.0%** |

Tulsi contains a wide variety of bioactive compounds. Secondary metabolites like beta-caryophyllene, methyl eugenol, and eugenol contribute to tulsi’s distinctive aroma and many of its therapeutic properties. Additionally, tulsi contains various primary metabolites, including flavonoids, tannins, alkaloids, glycosides, steroids, carbohydrates, and proteins.

**Chemical test:**

**Alkaloid Tests:**

**1)Mayer’s Test:**

Add 1% hydrochloric acid to 5 mg of Ocimum sanctum extract, gently heat.

Presence of alkaloids indicated by a red color, due to potassium mercuric iodide in Mayer’s reagen**t.**

**2)Wagner’s Test:**

Add 0.5 ml of Wagner’s reagent to 5 mg of extract and shake.

Reddish-brown color suggests alkaloids are present, as iodine forms an insoluble complex.

**3)Dragendorff’s Test:**

Add **a** drop of Dragendorff’sreagenttotheextract**.**

Orange-red color confirms the presence of alkaloids, with Dragendorff’s reagent containing bismuth nitrate and iodine.

**Flavonoid Test:**

**1)Shinoda Test:**

Add magnesium and concentrated hydrochloric acid to 5 mg extract.

Pink, orange, red, or crimson colors indicate flavonoid types:

Orange to red: flavones

Red to crimson: flavonoids

Crimsontomagenta**:** flavonones

Catechins yield red-pink with vanillin in hydrochloric acid.

**2)Lead Ethanoate Test:**

Add lead ethanoate solution to the aqueous extract.

Buff color formation indicates flavonoid presence.

**3)Sodium Hydroxide Test:**

Add 10% sodium hydroxide to extract, producing a yellow color.

The color fades to colorless with the addition of dilute hydrochloric acid if flavonoids are present.

**4)Alkaline Reagent Test:**

Add 2% sodium hydroxide to extract.

Yellow color turning colorless with dilute acetic acid suggests flavonoid presence.

**5)Ferric Chloride Test:**

Add ferric chloride after dilute ammonia and sulfuric acid.

Yellowishcolorindicatesflavonoids**.**

**Glycoside Tests:**

**1)Liebermann’s Test:**

Mix extract with chloroform and acetic acid, cool in ice, add concentrated sulfuric acid.

Violet to green color change indicates glycosides.

**2)Salkowski’s Test:**

Mix extract with chloroform, add concentrated sulfuric acid and shake.

Reddish-brown color indicates glycoside presence.

These color reactions help in the identification of specific groups of bioactive compounds, providing insights into the chemical composition of plant extracts like Tulsi.

**3)** **Keller**-**Kiliani** **Test**

Procedure: Add 5 mg of the extract to a test tube. Add 1 ml of glacial acetic acid and a few drops of a 2% solution of ferric chloride.Carefully add 1 ml of concentrated sulfuric acid to the mixture.

Observation: Formation of a brown ring at the interface indicates the presence of cardiac glycosides.

**Test** **for** **Tannins:**

**1)Ferric Chloride Test:**

Mix 5 mg of aqueous extract of Ocimum sanctum with 0.5 ml of ferric chloride solution.

Observation: Blackish precipitate formation confirms the presence of tannins.

**2)Gelatin Test:**

Mix 5 mg of extract with gelatin and add 1 ml of water.

Observation: White precipitate formation indicates tannins.

**3)Lead Acetate Test:**

Mix 5 mg of test sample with a few drops of basic lead acetate.

Observation: Formation of a brown, bulky precipitate confirms tannins.

**Test** **for** **Saponins**:

**1)foam test:**

Procedure: Dissolve 1 ml of extract in 5 ml of distilled water. Shake well to produce foam, then add a few drops of olive oil.

Observation: Persistent foam confirms the presence of saponins.

**Test** **for** **Oils:**

1)**Stain** **Test**:

 Spread a small quantity of aqueous extract onto filter paper.

Observation: Oil stain on the paper indicates the presence of oils.

**2)Saponification** **Test**:

Mix a few drops of alcoholic potassium hydroxide and 0.5 ml of extract in a test tube, and add 1-4 drops of phenolphthalein. Heat in a water bath for 1 hour.

Observation: Partial neutralization of alkali indicates the presence of oils and fats.

**Pharmacological activity:** In Ayurveda, Ocimum sanctum, commonly known as Tulsi, holds significant importance and is mentioned in the Charaka Samhita for its use in treating a range of conditions, including headaches, rhinitis, stomach disorders, inflammation, heart diseases, various forms of poisoning, and malaria. Each part of the Tulsi plant contributes uniquely to its therapeutic profile, and its pharmacological activities have been demonstrated through scientific studies. Here is an outline of its known pharmacological activities:

1)Antimicrobial Activity

2)Anti-inflammatory Activity

 3)Antidiabetic Activity

4)Anticancer Activity

 5)Antiulcer Activity

 6)Antifungal/Anticandidal Activity

 7)Thyroid Activity

* **Antidiabetic** **Activity :**

Observations: Oral administration of Ocimum sanctum (OS) extracts has shown a significant reduction in blood glucose levels in normal, glucose-fed hyperglycemic, and streptozotocin-induced diabetic rats. These effects demonstrate the plant’s hypoglycemic action.

Mechanism: Studies suggest that compounds in OS leaf extracts stimulate physiological pathways of insulin secretion, potentially enhancing insulin release. However, the exact mechanism of action remains to be fully understood, and more research is needed to clarify its antidiabetic effects.

* **Anticancer** **Activity :**

Ayurvedic Background: In traditional Ayurvedic medicine, many plants, including Ocimum sanctum, are considered effective for anticancer and antitumor purposes.

Research Findings: The ethanolic extract of Ocimum sanctum has been shown to reduce tumor cell size and increase the lifespan of mice with Sarcoma-180 solid tumors. Similar studies with a dose of 200 mg/kg administered orally also observed positive effects.

Radioprotective Properties: Ocimum sanctum has demonstrated an ability to protect DNA from radiation damage, which could have applications in radiation protection for cancer patients.

* **Antifungal**/**Anticandidal** **Activity :**

Mycosis and Infection Prevention: Fungal infections, such as mycosis, can result from inhalation of fungal spores or contact with fungal colonies on the skin. While maintaining hygiene is essential for prevention, there is also a demand for natural antifungal agents.

Essential Oil Composition: GC-MS analysis of Ocimum sanctum essential oil revealed high levels of methyl eugenol (44.63%) and linalool (21.84%), compounds with antifungal properties that contribute to the plant’s effectiveness in combating fungal infections.

Ocimum sanctum shows promise in diverse therapeutic applications, including as an antidiabetic, anticancer, and antifungal agent, highlighting its potential value in both traditional and modern medicine.

**Table no 4 : pharmacological Action**

|  |  |
| --- | --- |
| **Pharmacological Action**  | **Plant part used**  |
| Anti fungal  | Leaves  |
| Anti diabetic  | Leaves  |
| Anti cancer  | Root |
| Anti microbial  | Leaves  |
| Anti ulcer  | Leaves  |

**Result :**

Organoleptic Characteristics and Chemical Constituents of Tulsi (Ocimum sanctum)

Organoleptic Analysis:

Conducted by observing the color, odor, and texture of Ocimum sanctum leaves using visual inspection. This provides basic identification and quality assessment of the herb. (Details in Table No. 1)

Chemical Constituents:

The leaves contain multiple bioactive compounds, including flavonoids, tannins, steroids, carbohydrates, proteins, essential oils, glycosides, and alkaloids. These compounds contribute to the pharmacological actions of Tulsi. (See Table No. 3)

Pharmacological Actions:

Each chemical constituent in Ocimum sanctum leaves supports various therapeutic activities, including antimicrobial, antifungal, antioxidant, anti-inflammatory, antidiabetic, and anticancer effects. (Details in Table No. 4)

**Conclusion:**

The study of Tulsi (Ocimum sanctum), commonly known as Holy Basil, highlights its extensive medicinal properties and its importance in different pharmacopoeias. Known by multiple synonyms and classified under the Lamiaceae family, each part of the Tulsi plant has unique medicinal value.

The monograph of Ocimum sanctum reveals its distinctive therapeutic actions, such as:

Antimicrobial: Effective against a range of pathogens.

Antifungal: Useful in treating fungal infections.

Antioxidant: Helps neutralize free radicals.

Anti-inflammatory: Reduces inflammation in various conditions.

Antidiabetic: Lowers blood glucose levels.

Anticancer: Demonstrates protective effects against cancer cell growth.

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