

## ANTIMICROBIAL ACTIVITY OF TULSI EXTRACT – A Review

Dr. M. Pavani <sup>\*1</sup>, P.Nisha<sup>\*2</sup>, M.Pavankumar<sup>\*3</sup>, P.Saisirisha <sup>\*4</sup>, P.Dhanasaiteja<sup>\*5</sup>, P.Mukesh <sup>\*6</sup>

<sup>\*1</sup> Dr. M. Pavani, Professor, Dept of Pharmaceutics, Avanthi institute of pharmaceutical sciences.

<sup>\*2</sup> P.Nisha, B- Pharm student,Avanthi institute of pharmaceutical sciences .

<sup>\*3</sup>M.Pavankumar , B- Pharm student,Avanthi institute of pharmaceutical sciences.

<sup>\*4</sup> P.Saisirisha, B- Pharm student,Avanthi institute of pharmaceutical sciences.

<sup>\*5</sup> P.Dhanasaiteja, B- Pharm student, Avanthi institute of pharmaceutical sciences.

<sup>\*6</sup>P.Mukesh, B- Pharm student, Avanthi institute of pharmaceutical sciences.

-----\*\*\*-----

### ABSTRACT

The therapeutic value of tulsi is enormous. Tulsi has also been demonstrated in studies to be beneficial for diabetes by lowering blood glucose levels. The identical research demonstrated a noteworthy decrease in overall cholesterol levels when using Tulsi. According to another study, Tulsi's antioxidant qualities are what provide it a positive impact on blood glucose levels. The best treatment for severe acute respiratory syndrome is Rama tulsi. Its leaf juice relieves cough, bronchitis, fever, and colds. Another ear drop that is utilized is tulsi oil. Malaria can be cured with tulsi. It works well for cholera, headaches, sleeplessness, hysteria, and indigestion. Every day, millions of people consume fresh Tulsi leaves. Tulsi, the "queen of herbs," has been used for generations.

**KEYWORDS:** Ocimum sanctum, antibacterial action, leaf extract, good diffusion, and Ocimum tenuiflorum

### Introduction:

A natural product is a material that is created by a living thing and is present in nature. It typically possesses pharmacological or biological properties that might be useful in drug design and discovery. Organic goods are vital in the management of illnesses that pose a threat to life. Natural products can be extracted from plant or marine organism tissues, or they can be fermented by microorganisms. Pharmaceutical researchers have recently shown a significant deal of interest in plant-derived compounds because of their many applications. The richest bioresource of pharmaceuticals for conventional medical systems, contemporary medical systems, nutraceuticals, food supplements, traditional medicinal systems, pharmaceutical intermediates, and chemical entities for synthetic medications is found in medicinal plants. The aromatic herb *Ocimum tenuiflorum* is also referred to as *Ocimum sanctum*, holy basil, or tulsi.

### **ANTIMICROBIAL PROPERTIES:**

#### **Antibiotic Intensity**

Examining the antibacterial activity of leaf extract and local river water in varying concentrations inside the *Ocimum sanctum*, it was found that the treated water concentration exhibited superior antimicrobial activity at 15 to 16 hours compared to the other extract concentration. When treated with water, the extract exhibits 95–98% antibacterial activity in 14–16 hours. The extract concentration was used to determine the minimal bacterial concentration (MBC). It is possible to examine how the concentration of bacterial cells was progressively inhibited for an hour using the spread plate method. After concentrated water treatment for 15 to 16 hours at a PH range of 6.8 to 7.0 in both samples, the highest antibacterial activity was seen, indicating that this plant.

### **ADVANTAGES OF TULSI PHYTOCONSTITUENTS:**

The anti-inflammatory, antibacterial, anti-irritant, and anti-cancer properties of bisabolol include perfumery wound healing. The essential oils in Tulsi provide Borneol its insect-repelling properties. Additionally, coffee acid possesses antifungal, antioxidant, and anticancer properties. Calamine's presence indicates that it has dermatological activity. Because tulsi contains esculetin, it is also used as an anticoagulant, sunscreen, and medical diagnostic.

### **DISADVANTAGES OF TULSI PHYTOCONSTITUENTS:**

Male and female reproductive health is impacted by tulsi overdose and its derivatives. Low testicular weight, sperm death, and a decrease in sperm count are the results of this. Additionally, an antiestrogenic effect has been noted. It may cause increased uterine contractions and can create problems during labor or mensuration during pregnancy. It may lead to blood thinning. Thus it is avoided in anti-clotting drugs.

### **PREPARATION:**

The *Ocimum sanctum* L. plant in its whole was acquired from the botanical garden of KLE Ayurvedic College in Belgaum. The fresh plant material was ground into a coarse powder, dried in the shade, and cleaned in distilled water. Then extract the plant material, after completion of extraction, a cold maceration procedure was applied to 250 milliliters of ethanol after 50 grams of the powdered sample had been weighed and added.

For five days, the flask was stored with sporadic shaking. After that, the sample was filtered through sterile muslin cloth. Using Whatman No. 1 filter paper, the filtrate was once again filtered. After the filtrate was concentrated using a rotavapor evaporator, it was transferred into large glass petriplates and dried in a hot air oven at 400 degrees Celsius until all of the solvent had evaporated.

### **DETERMINATION:**

Using the serial broth dilution method, the minimum inhibitory concentration (MIC) of the extract against *Streptococcus mutans* and *Lactobacillus acidophilus* was determined. The lowest inhibitory concentration was determined by diluting the extract nine times using BHI. There was just 200 µl of 10<sup>-1</sup> extract in the first test tube. Test tube 200 µl was diluted to a 10<sup>-2</sup> ratio by moving it to a second tube. For every extract, the serial dilution process was repeated up to a dilution of 10<sup>-8</sup>. 200 µl of the aforementioned culture suspension was added to each tube that was serially diluted. The last solutions containing 200 µl were disposed of from the last tube. The media and culture suspension was the only thing in the final tube. Using the serial dilution approach, concentrations of 10%, 5%, 2.5%, 1.25%, 0.62%, 0.31%, 0.15%, 0.07%, and 0.03% were obtained, respectively. The tubes were retained.

### APPLICATIONS:

Tulsi is mentioned as being quite helpful in treating heart conditions, headaches, rhinitis, stomach problems, inflammation, many types of poisoning, and malaria in the ancient Ayurvedic literature Charaka Samhita. Every component of the plant has been shown to provide protection against a range of diseases; the leaves' aqueous and alcoholic extracts have a number of pharmacological activities, including hepatoprotective, anti-inflammatory, antipyretic, analgesic, antiasthmatic, antiemetic, antidiabetic, and antistress agents. Furthermore, the plant's oil, which is widely utilized in the pharmaceutical sector mostly for skin cream preparations, is obtained through distillation of the leaves. This oil is believed to possess antibacterial, antioxidant, and anti-inflammatory qualities, antimicrobial efficacy. Tulsi is recognized for its antibacterial properties against a range of bacteria, with Candida being the most prevalent.

### Review of literature

S. NO	AUTHOR NAME	NAME OF THE PLANT	ACTIVITY	TYPE OF FORMULATION
1.	GOMATHINAYAGAM SUBRAMANIAN, BRI B.TEWARI, REKHA GOMATHINAYAGAM	TULSI	ANTI MICROBIAL	CREAMS
2.	NAVEEN SRINIVAS, KETKI SALI, ATUL A BAJORIA	KRISHNA TULSI	ANTI FUNGAL	OINTMENT
3.	SINGH S, AGARWAL SS	RAM TULSI	ANTI INFLAMMATORY	OIL
4.	HALDER N, MANDAL S, NAIR VD, ETUL	LAKSHMI TULSI	ANTI DIABETIC	TABLETS

## CONCLUSION:

The dissolution of the organic extracts (Chloroform, methanol, ethanol and ethyl acetate) were aided by water, which did not affect the growth of microorganism, in accordance with our control experiments. The surfaces of media were inoculated with bacterial from a broth culture. After 18 h of incubation at a specific temperature 28°C-30°C for *E. coli*, *S. aureus* and *C. albicans*, the plates were examined and the diameters of the inhibition zones were measured to the nearest millimeter. Experimental studies of Tulsi have shown to inhibit acute as well as chronic inflammation in rats. This test was conducted by carrageenan-induced paw edema, croton oil-induced granuloma, and exudates at a dose of 500 mg/kg, bw/day. The oils processed from fresh leaves and seeds of *O. sanctum* have revealed anti-inflammatory effects on experimental animals induced by carrageenan, histamine, serotonin and prostaglandin E2 according to some studies. These experimental rats were administered with essential oil (200 mg/kg, bw) and fixed oil (0.1 ml/kg, bw) before injection of phlogistic agents and were compared with standard drug flurbiprofen. It was noted that Tulsi extracts could significantly reduce the edema when compared with the saline treated control. However, its effect was less than the standard drug. Fixed oil of Tulsi can prevent enhanced vascular permeability and leukocytic activity as evidenced by carrageenan-induced inflammatory stimulus. Antifungal activity has been shown by Tulsi in a study where the minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC) of various extracts and fractions were tested against clinically isolated five different dermatophytic fungi which showed antifungal activity at a concentration of 200 µg/mL. The fungicidal activity is said to be due to the action of secondary metabolites which are present in Tulsi including alkaloids, glycosides, saponins, tannins, ascorbic acids eugenol and various other metabolites, as mentioned previously. Oral administration of *O. sanctum* extract led to a marked lowering of blood sugar in normal, glucose-fed hyperglycemic and streptozotocin-induced diabetic rats. A randomized, placebo-controlled, cross over single blind human trial indicated a significant decrease in fasting and postprandial blood glucose levels by 17.6% and 7.3%, respectively. Urine glucose levels showed a similar trend. Further, OS has aldose reductase activity, which may help in reducing the complications of diabetes such as cataract, retinopathy, etc A study conducted on rats has suggested that constituents of *O. sanctum* leaf extracts have stimulatory effect on of insulin secretion. A combination of Tulsi and Neem extracts has shown to lower the sugar levels in humans.

**REFERENCES:**

1. Mishra BB, Tiwari VK. Natural products: An evolving role in future drug discovery. *Eur. J. Med. Chem.* 2011;46:4769–4807.
2. Rey-Ladino J, Ross AG, Cripps AW, McManus DP, Quinn R. Natural products and the search for novel vaccine adjuvants. *Vaccine.* 2011;29:6464–6471.
3. Cragg GM, Newman DJ. Biodiversity: A continuing source of novel drug leads. *Pure Appl. Chem.* 2005;77:7–24.
4. Haefner B. Drugs from the deep: Marine natural products as drug candidates. *Drug Discov. Today.* 2003;8:536–544.
5. Warrier, P K (1995). Indian Medicinal Plants. *Orient Longman.* p. 168.
6. Kothari, S K Bhattacharya, A K, et al. (November/December 2005). "Volatile Constituents in Oil from Different Plant Parts of Methyl Eugenol-Rich *Ocimum tenuiflorum* L.f. (syn. *O. sanctum* L.) Grown in South India". *Journal of Essential Oil Research: JEOR.* 2008-09-05.
7. Kuhn, Merrily David Winston (2007). Winston and Kuhn's Herbal Therapy and Supplements: A Scientific and Traditional Approach. *Lippincott Williams and Wilkins.*
8. Agarwal P, Nagesh L, Murlikrishnan. Evaluation of the antimicrobial activity of various concentrations of Tulsi (*Ocimum sanctum*) extract against *Streptococcus mutans*: an in vitro study. *Indian J Dent Res.* 2010 Jul-Sep; 21(3):357-9.
9. Gupta B, Kumar VN, Mallaiah S. Assessment of Antimicrobial Activity of Various Concentrations of Commercially Available Tulsi (*Ocimum Sanctum*) Powder against *Streptococcus Mutans*. *Open Journal of Dentistry and Oral Medicine.* 2013; 1(2): 19-24
10. Balakumar S, Rajan S, Thirunalasundari T, Jeeva S. Antifungal activity of *Ocimum sanctum* Linn.(Lamiaceae) on clinically isolated dermatophytic fungi. *Asian Pac J Trop Med* 2011;4:654-7.