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Comparative Assessment of Antimicrobial Potential and Antioxidant Activity of *Origanum vulgarae* (Badri Tulsi) and *Ocimum sanctum* (Holy Basil)

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ABSTRACT

In recent years scholars worldwide have realized that the effective life span of any antimicrobial agent is limited, due to the increasing development of resistance by microorganisms. Consequently, numerous studies have been conducted to find new alternative sources of antimicrobial agents, especially from plants. The aims of this work were to examine the antimicrobial potential of essential oils distilled from two species of tulsi. *Ocimum vulgare* (badri tulsi) and *Ocimum sanctum* (Holy basil) to quantify the volatile components present in both species, and to investigate the compounds responsible for any activity. Broth micro-dilution was used to determine the minimum inhibitory concentration (MIC) of Tulsi essential oil against selected microbial pathogens. The oils, at concentrations of 4.5 and 2.25% completely inhibited the growth of *Staphylococcus aureus* (including MRSA) and *Escherichia coli*, while the same concentrations only partly inhibited the growth of *Pseudomonas aeruginosa*. for this activity; camphor, eucalyptol and eugenol. Since *S. aureus* (including MRSA), *P. aeruginosa* and *E. coli* are major pathogens causing skin and soft tissue infections, Tulsi essential oil could be a valuable topical antimicrobial agent for the management of skin infections caused by these organisms.

INTRODUCTION:

Herbs are generally used by patients who seek regular health care. Herbs are a widely distributed and widespread group of plants, excluding vegetables and other plants consumed for macronutrients. In other words, herbs are a large number of plants with therapeutic, culinary or other uses. Some herbs have been extensively studied, but little is known about others. *Origanum vulgare*, belonging to the Lamiaceae family, is a principal culinary herb used worldwide that possesses great antioxidant and antibacterial properties corresponding to various volatile organic components (VOCs). A well-known 'Badri Tulsi' of Devbhumi Uttarakhand is a strongly aromatic, pubescent perennial herb with broadly ovate leaves and bears pink, purple or white flowers in terminally clustered corymbose cymes subtended by reddish-purple or green bracts. The species grows commonly on moist open grassy slopes, often along forest edges, in rocky-grassy meadows, terrace edges and overgrazed areas at (750-) 2000-3000 (-3300) m elevation throughout temperate, sub-alpine and lower alpine zone of Garhwal and Kumaun Himalaya and flowers in July-October. The plant is considered as sacred and, leaves and flowers are offered in the temple of Lord Badrinath hence the name 'Badri Tulsi'. The genus *Ocimum* belongs to the family Lamiaceae, and comprises about 68 species indigenous to tropical regions of Asia, Africa and, Central and South America. *Ocimum sanctum* Linn. (*Os*) synonym *Ocimum tenuiflorum* L. (Lamiaceae), the most prominent species of the genera is cultivated worldwide for its medicinal, perfumery, religious, ceremonial, food and essential oil importance. *Os* is a short-lived perennial shrub of 30–60 cm height with hairy stems and sparsely hairy leaves, which is distributed in the Himalayas up to an altitude of 6000 feet. This aromatic shrub is commonly known as *Holy Basil* or *Tulsi* and identified as two common cultivars, *Rama Tulsi* with green leaves and *Krishna Tulsi* with purple leaves. Have been reported for anti-diabetic, wound healing, antioxidant, radiation protective, immunomodulatory, antifertility, anti-inflammatory.

FIG 1 Ocimum sanctum

Fig 02 Ocimum vulgaris

MATERIALSANDMETHODS;

Source of tulsi: Tulsi (*Ocimum sanctum***)** and badri tulsi **(***Ocimum vulgare) both are* collected from district Chamoli Uttarakhand and authenticated by FRI Dehradun, Uttarakhand.

Extraction: In this experiment the fresh leaves were used for steam distillation for 6 hrs in soxhlet apparatus. The volatile oil was collected and yield was calculated by (W/V). The yellow color volatile oil was stored in sealed container at 4^0C in dark place.

Biological activity:

Antimicrobial activity: Antimicrobial activities of essential oil were determined against different types of pathogenic bacteria namely *Salmonella typhi*, *Pseudomonas aeruginosa*, *Staphylococcus aurous* and *Escherichia coli*. Fresh culture of target bacteria adjusted to 1×108 CFU /mL with 0.5 McFarland standards were inoculated over the surface of sterilized dry plates of Agar (Oxoid UK) using a sterilized cotton swab. Wells (6 mm) were bored in the media plates and of extracts (100 µL) were aseptically poured into each well. The Patri dishes were placed incubator for 16-24 h at 37°C. The diameter of the inhibition zone was recorded in millimetres (mm). The DMSO were used as negative control and antimicrobial drug Doxycycline (DO 30 µg) were employed as positive control in this study.

Antioxidant Activity:

Preparation of extracts: The plant extracts were prepared by two different concentrations (5gm& 10 gm) of crude drug dissolved in 95%of 50 ml of Methanol. For 3-5 days with intermittent shaking. At the end of extraction, it was passed through Whatman filter paper. And the methanolic filtrate was collected.

DPPH radical scavenging activity: The free radical scavenging activity of different plant extracts was performed by DPPH method. Two different concentration (0.2 & 0.1gmper ml) of crude extracts of the *ocimum sanctum* was prepared in methanol; 50 microliter of test solution was taken with 2.95 ml of DPPH and the absorbance of the solution was measured at 517nm DPPH solution without the test solution was used as control. The percentage activity was calculated by using following formula.

Qualitative phytochemical analysis: Qualitative analysis for detection of tannins, phlobatannins, flavonoids, saponins, alkaloids, cardiac glycosides, terpenoids, steroids, anthraquinone, free anthraquinone, carotenoids and reducing sugar were performed.

RESULTS:

Table 01 (Qualitative Phytochemical Screening)

Phytochemical Test	**Methanolic extracts of *Ocmium sanctum***	**Methanolic extracts of *Origanum vulgarae***
Alkaloids	**yes**	**yes**
Alkaloids	**yes**	**Yes**
Flavonoids	**yes**	**yes**
Terpenes	**yes**	**yes**
Carbohydrate	**yes**	**yes**
Glycoside	**yes**	**yes**
Phenol	**yes**	**yes**
Tannins	**No**	**No**
Saponin	**No**	**yes**
Xanthoprotein	**No**	**yes**
Resins	**Yes**	**yes**
Carboxylic acid	**Yes**	**No**
Amino acid	**No**	**No**
Quinones	**No**	**No**

Table 02 (comparative Anti-microbial activity between *Ocimum sanctum* & *organum vulgaris*)

S.NO	NAME OF MICROBIAL STRAINS	IZD OF *ORGANUM VULGARAE*	IZD OF *Ocimum sanctum*	GENTAMYCIN AS A STD DRUG
1	*Salmonella typhi*	6.8MM	7.31MM	12MM
2	*Pseudomonas aeruginosa*	5.3MM	6.21MM	1OMM
3	*Staphylococcus aurous*	6.1MM	6.23MM	12MM
4	*Escherichia coli*.	4.01MM	3.21MM	13MM

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