

# Ocimum sanctum removes impurities from water and plays disinfectant role

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The present study was listening carefully on evaluation of antimicrobial activity of *Ocimum sanctum* leaf extract in normal tap water and local river water. The antimicrobial result was calculated with different concentration (100 to 600 mg l-1) of tulsi leaf extract in tap water. In this case it contains 600 mg l-1 concentration of plant extract treated with water and show effective antimicrobial activity at 15 to 16 hrs than after that the other concentration extracts. It also contains 500 mg, l-1 of extract treated with water showed 95 to 98% antibacterial activity in 14 to 16 hrs. Tulsi is a Sanskrit word which means “matchless one”. Several medicinal properties have been credited to the Tulsi plant. In ayurveda, tulsi used as anti asthmatic drugs. It is also used in treatment of fever, bronchitis, arthritis, convulsion etc. Scientific explorations of traditional belief of medicinal properties of Tulsi have got momentum mostly after the middle of the 20th century. *Ocimum sanctum* (Tulsi or holy basil) has a very special place in the Hindu culture. The minimum bacterial concentration (MBC) was observed in 500 and 600 mg l-1 extract concentration. The concentration of the bacterial cells reserved gradually for an hour was studied by spread plate method.

**Keyword:** Minimum Bactericidal Concentration, Microbial growth. *Ocimum sanctum*, Antimicrobial effect,

## 1. Introduction

Plants are of the important sources of medicine & a large numbers of drugs in use are resulting from plants. The therapeutic uses of plant are safe, economical & effective as of availability [1]. Among the plants known form value, the plants of genus *Ocimum* belonging to family Lamiaceae are very important for their therapeutic potentials. *Ocimum sanctum* has two varieties i.e. black (*Krishna Tulsi*) and green (*Rama Tulsi*), their chemical constituents are similar [2]. Tulsi is a Sanskrit word which means “matchless one”. Several medicinal properties have been recognized to the Tulsi plant not only in Ayurveda and Sridhar but also in Greek, medicinal use of plants is very old. Literatures indicate that the paretic use of plants is as old as 4000-5000 B.C and Chinese used first the natural herbal preparations a medicines [4]. Earliest references are available in Rig-Veda which is said to be written between 3500-1600 B.C [5]. Tulsi (*Ocimum sanctum*), Queen of Herbs, the Legendary, “Incomparable One” is one of the holiest and most cherished of the many health-giving herbs distributed mainly in the oriental region [6]. Tulsi a widely grown, sacred plant belongs to the lamiaceae family. It is called by names like Rama Tulsi, Krishna Tulsi in Sanskrit and Holy Basil in English. The natural habitat of Tulsi varies from sea level to an altitude of 200 m. It is found growing naturally in moist soil nearly all over the globe [7]. In Nepal, Aryan people grow Tulsi as a religious plant in their homes, temples and their farms. They use Tulsi leaves in routine worship. Three main form generally recognized Rama Tulsi and Krishna Tulsi with stems and sometimes also leaves of purple and Vane Tulsi which is unmodified from its wild form. Variations in soil type and rainfall may also equate to a difference in the size and form of the plants as well as their medicinal strength and efficacy. *Ocimum* genus contains between 50 to 150 species of herbs and shrubs from the tropical regions of Asia [8]. Plants have square stems, fragrant opposite leaves and whorled flower on spiked inflorescence [9]. The essential oil of basil extracted via steam distribution from the leaves and flavoring tops are used to flavor foods, dental and oral products, in fragrances and in traditional rituals and medicines [10, 11]. Extracted essential oils have also been shown to contain biologically active constituents that are insecticidal [12], nematicidal [13] these properties can be frequently attributed to predominate essential oil constitutes [14]. With this focused on evaluation of antimicrobial activity of *Ocimum sanctum* leaf extract in normal tap water and local river water.

## 2. Materials and Methods

### 1) Optimization of Treatment Period

Tulsi leaf crude extract (100mg in 2ml of sterile distilled water) was dissolved in 1 liter of tap and river water maintained at a pH of 6.8-7.0, treated for different treatment periods (1-16 hrs). Water samples (5ml) were withdrawn for every hour and the sample was subjected to Microbiological analysis by plate method and counted as CFU/ml.

### 2) Water Sample

The water samples were collected from Baghmati river of Kathmandu Valley and local tap waters from Biotechnology Research Laboratory, Amrit Science Campus and Thamel and stored in a sterile plastic can.

### 3) Optimization of Treatment dosage

After optimizing the treatment period, treatment dosage is optimized. Different treatment dosages (100, 200, 300, 400, 500 and 600 mg *Ocimum sanctum* leaves extract in 2 ml sterilized distilled water) were prepared as mentioned earlier. To 1 liter of tap and river water, the treatment dosages were treated individually and incubated for 16 hrs at room temperature and plating was done for microbial analysis.

### 4) Preparation of Tulsi Leaf Crude Extract

Rama Tulsi was cultivated in the local garden. Tulsi leaves were plucked from the plant, washed With tap water and subsequently with sterile distilled water (3 times). The pre weighed leaf Materials were crushed by mortar & pestle and extracted with sterile distilled water.

### 5) Estimation of Microorganisms by Plate Count Method.

The original inoculums are diluted in a series of dilutions. Each succeeding dilution will have only one-tenth the numbers of microbial cells as the preceding tube. Then the samples of the dilution samples are used to inoculate (spread plate) the Petri plate on which the colonies grow and can be counted. The water sample containing bacteria (*E. coli*) are streaked on to the Nutrient Agar medium to check the growth of bacteria.

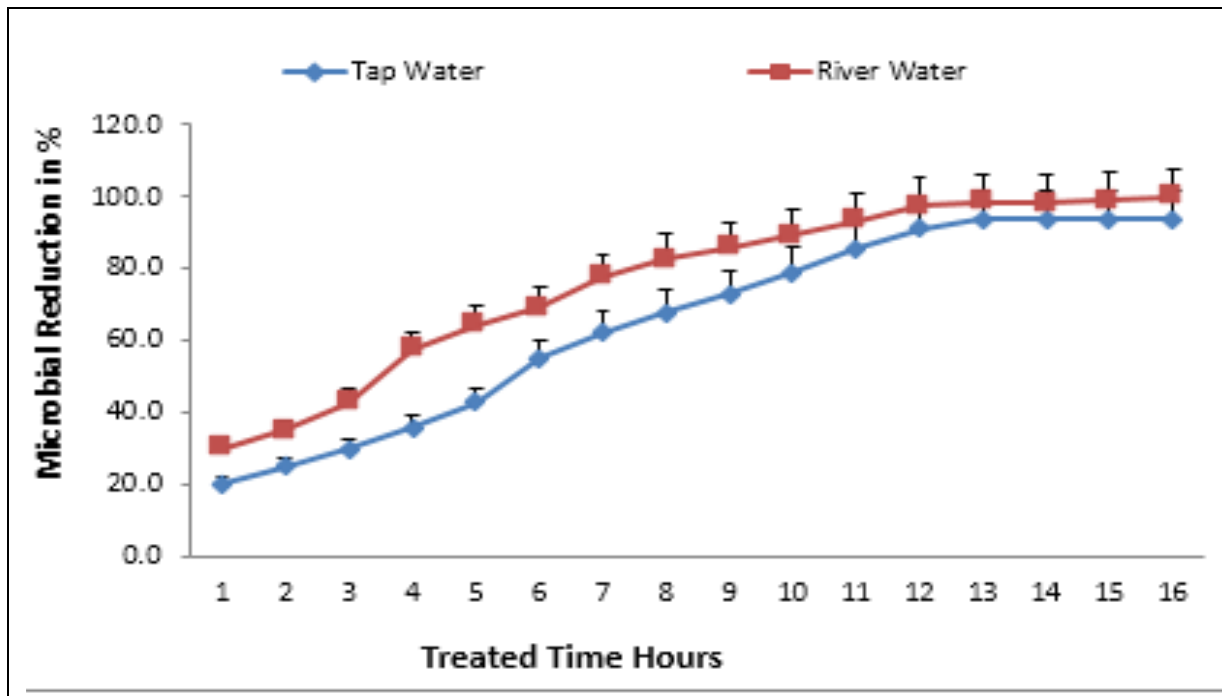
### 3) Statistical Analysis

All data were analyze by using one-way ANOVA (Sigma Stat v2.01, Handle Corporation)

When as significant treatment effect was observed, a least significant difference test was used to contrast resources. Treatment effects were measured with the significant level at  $P < 0.05$ .

## 4) Results

Evaluation of the antimicrobial potential of plant extract was performed by optimizing the treatment period and antiseptic dosage for different kind of drinking water. For the fixed amount of antiseptic dose it contain 100 mg l-1 treated water to plate counting. The results exposed that the microbial populations were gradually reduced from 22,000 cells in control to 16,000 cells at 16 hours treatment and after which the reduction stabilize. Hence 16 hours treatment period was taken as the optimization period. After six different dose treatments of plant extract, two different dose range 500 mg l-1 and 600 mg l-1 concentration treated water samples shows best antimicrobial activity in both water samples. In tap water 600mg of extract treated water gave 45% activity at 1 hour and 100% activity while reaching 15 hours treatment and 500mg l-1 treated water showed 95% of antimicrobial activity and rest of the dosage gave lesser activity. From this experiment the higher concentration 600 mg l-1 shows 100% antibacterial activity at 16 hrs treatment which indicates that the minimal bacterial concentration was observed In 600mg l-1 of leaf extract and then in 500mg



## 5) Discussion

Emperor of herbs *Ocimum sanctum* plant (Tulsi/Holy Basil) has got very well documented Helpful effects of its different parts in many medical conditions<sup>17</sup>. Preliminary review shows That very few workers attempted to look into the various changes in reproductive system in detail after feeding *Ocimum sanctum* leaves extract [18]. Tulsi is well-known for its important role in the traditional Ayurvedic and holistic health and herbal medicine of the East<sup>19</sup>. Medicinal, religious and culinary use of Tulsi has also been recognized for centuries in China and the rest of Asia, the Middle East, North Africa and Australia [20]. According to Ayurvedic system of medicines a large number of plants are employed in the conventional medicines for the treatment of several diseases like cancer [21, 22], leprosy [23], hepatic disease [24], paralysis [25], Urinary stone track disease [26], depression and other nervous disorder [27] and diabetes [28]. Ancient literature Rigveda and Atharveda mention 67 and 290 medicinal plants respectively [30]. The main properties of *Ocimum sanctum* lowers blood sugar levels, antispasmodic, lowers blood pressure [31]. Tulsi leaves have anti-inflammatory [32], anabolic hypoglycemic [33], cardiac depressant [34], antifertility [35], antiulcer [36], antidiabetic [37], anticancer [38], antioxidant [39], antistress [40].

## 6. Conclusion

Current scientific research offers substantial evidence that tulsi protects. And reduces Stress; enhances stamina and endurance; increases the body's efficient use of oxygen; boosts the Immune system; reduces inflammation; protects against radiation damage; lessens aging factors; Supports the heart, lungs and liver; has antibiotic, antiviral and antifungal properties; enhances the efficacy of many other therapeutic treatments; and provides a rich supply of antioxidants and Other nutrients. Overall, tulsi is a premier helping the body and mind to adapt and cope with a wide range of physical, emotional, chemical and infectious stresses, and restore concerned physiological and psychological functions to a normal healthy state. These general vitality enhancing and health promoting properties, in addition to tulsi' many more specific therapeutic actions, likely account for much of the remarkably broad range of tulsi' traditional medical uses, as well as causal to its mythological importance and religious sanctity. Tulsi Leaf extract have great potential as antimicrobial agent for the treatment of water. The treatment is simple, cost-effective, ecofriendly, reachable for all and the components present in *Ocimum sanctum* leaves have no side effects to human compared to chemical treatment. More over the water treated with Tulsi extract serve not only as germ free but also as Medicinal water.

## 7. References

- 1). Nishida, R., W.S. Bowers, and P.H. Evans. 1984. From the Oil of sweet basil *Ocimum basilica* L.J. Chem. Ecol 10: 1435-1450.
- 2). Duncan D B. Multiple range and multiple F tests. Biometrics 11:1-42, 1955.
- 3). Singh S., Taneja M. and Majumdar K. D. (2007). Biological Activity of *Ocimum Sanctum* L.fixed oil- An Overview. J of Exp Biology, 45: 403-412.
- 4). Mishra P. and Mishra S. (2011). Study of Antibacterial Activity of *Ocimum sanctum* Extract against Gram Positive and Gram Negative Bacteria. American J of Food Tech. 6:336-341.
- 5). Aswan K. M. and Joshi H. R. (2010). Anti-Cataleptic Activity of Various Extract of *Ocimum sanctum*. Of Parma Res and Development. 2: 1-7. 6. Patel R., Patel R., Airway B., and Ahirwar D. (2011).
- 6). Chopra R.N., Chopra I.C., Handan K.L., Kapur L.D.1982. Indigenous Drugs of India. Second edition (Reprinted) Academic Publishers, New Delhi.
- 7). Sanghi, S. and A.Kumar. 2002. Characterization of some of Ayurvedic Medicinal plants of family Fabaceae used for Leprosy. Int. J. Mendel **19(1-2)**: 13- 14.
- 8). Sharma, S. and A.Kumar. 2001. Ayurvedic plants for cure of Hepatic diseases, Int. J. Mendel **18 (12)**: 13-14
- 9). Mishra P, Mishra S. Study of antibacterial activity of *Ocimum sanctum* extract against gram positive and gram negative bacteria. Am J Food Techno 2011;6:336-41.
- 10). Mishra, A. and A.Kumar. 2000. Ayurvedic Medicinal plants for Skin disease. Int. J. Mendel **17**: 91-92.
- 11). Thakur K. Anti-inflammatory activity of extracted Eugenol from *Ocimum sanctum* L. leaves. Rasayan Journal of Chemistry 2009;2(2):472-4.
- 12). Mishra, A. and A.Kumar. 2001. Studies on Ayurvedic Crude Drugs for the cure urinary tract Stones. Int. J.Mendel 18 (1-2): 41-42.
- 13). Dash B, Kashyap L. Diagnosis and treatment of Galaganda, Gandamala, Apaci, granthi and arbuda. Cancer Treat Rev 1988; 15: 1–31.
- 14). Prakash, P, Gupta. N, 2005, Therapeutic uses of *Ocimum sanctum* Linn (Tulsi) with a note on eugenol and its pharmacological actions: A short review. Indian J Physiol Pharmacol, 49(2): 125-131.
- 15). Kumar V., Andola H.C., Lohani H. and Chauhan N. (2011). Pharmacological Review on *Ocimum sanctum* Linnaeus: A Queen of herbs. J of Pharm Res, 4:366- 368.
- 16). Mondal S., Bijay R. Miranda R. B., and Sushil C. M. (2009). The Science behind Sacredness of Tulsi (*Ocimum sanctum* LINN.). Ind J of Physiol Pharmacol. 53: 291-306.
- 17). Vishwabhan S., Birendra V. K. and Vishal S. (2011). A Review on Ethnomedical uses of *ocimum Sanctum*(Tulsi). Int Res J of Pharm. 2: 1-3.
- 18). Monga J., Sharma M., Tailor N. and Ganesh N. (2011). An time lanoma and radio protective activity of alcohol.

19). Sirkar NN. 1989. Pharmacological basis of Ayurvedic therapeutics. In: Cultivation and utilization of medicinal plants. Editors: Atal CK and Kapoor BM (Published by PID CSIR).

20). Jeba C. R., Vaidyanathan R. and Kumar R.G. (2011). Immunomodulatory activity of aqueous extract of *Ocimum sanctum* in rat. Int J on Pharmaceutical and Biomed Res 2: 33-38.

