TULASI (OCIMUM SANTUM) IN DENTISTRY- AN OVERLOOK

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ABSTRACT
Tulasi, ‘the holy basil’ is a prominent herb, that is used since the Vedic era as medicine. Currently many more systemic condition are cured through the use of various parts of this plant. This plant can be used for various diseases for treatment and maintenance of health. The oral health which could be called as indicator of systemic health is much more influenced by the use of this plant extracts.

Method- The phrase “Tulasi in dentistry” was searched in Google Scholar, Pubmed. 37 article were selected through criteria of inclusion, from there we selected 17 articles according to exclusion criteria.

Conclusion- THE study emphasized the use of various parts of the plant in dental use for treatment of diseases like caries, mucosal lesions and periodontal pathology. Along with that it can be used in root canal therapy as disinfectant irrigation. Further study is required to prescribe these extracts in dentistry.

KEYWORDS: Tulasi, Ocium santum, Eugenol, Dentistry.

INTRODUCTION
Tulasi (OCIMUM SANTUM Linn) is considered as a holy plant in mythology. It had been used since Athisarveda time in medicinal practice. Various disorders including cardiology, neurology, psychiatry and many more had been cured by using different parts of the plant. So also the dental disorder had been successfully tried. Dental diseases are mostly chronic in nature. Diseases like dental caries, periodontitis had been of fatal concern when we consider the spreading to systemic infection. Preventive and curative measure can be taken care by this Tulasi extract. There had been so many research in this field, but the inclusion of all the studies till date has not been published. So this article tries to explain Pharmacognosy of plant and the uses in dental disorders.

History
In India the earliest references of use of plants in medicine appear in Rigveda 3500–1600 B.C. The properties and therapeutic uses in detail recorded in Ayurveda (The indigenous system of medicine). Medicinal plants are rich in secondary metabolites and essential oils which had been used in pharmacology. The advantages of medicinal plant use are easy availability, cost, safety and effectiveness.

In Ayurveda Tulasi (Ocimum sanctum L.) is described as Dashemani Shwasaharni (antiasthmatic) and antikaphic drugs (Kaphaghna). The plants of genus Ocimum belonging to family Labiatae are very important for their therapeutic potentials. Ocimum sanctum L. (Tulasi), Ocimum gratissium (Ram Tulasi), Ocimum canum (Dulal Tulasi), Ocimum basilicum (Ban Tulasi), Ocimum kilimandscharicum, Ocimum americanum, Ocimum camphora and Ocimum micranthum are examples of known important species of genus Ocimum which grow in different parts of the world and are known to have medicinal properties.

METHOD
A single researcher had searched for the word ‘Tulasi in dentistry’ in Google scholar, pubmed central. The outcome was 37 articles. All article were thoroughly read by two researcher and only 17 relevant article included for review.

Inclusion criteria - Tulasi used in dentistry for medicinal purpose describing pharmacology.

Exclusion criteria- Those articles are not included, which do not describe pharmacology of any of the parts of the plant.

Pharmacology of various parts of the plant
Leaves: It contains essential oils including Eugenol, Ursolic Acid, Rosmarinic Acid Bcaryophyllene, Oleanolic Acid, B-Elemene & Germacrene D, Q & Pinene, Orientin And Vicenin. Nutritional components include Vitamin A & C, minerals calcium, iron & zinc as well as chlorophyll. Seeds contain fixed oils with Linoleic acid, Linolenic acid and Sitosterol.

Roots contain Sitosterol and three Triterpenes A,B,C

EUGENOL [2]
1. Membrane stabilizing property: neurological, inflammatory and allergic disorders
2. Anti-ulcerogenic: gastric ulcer
3. Decreases elevated blood sugar level, triglycerides, cholesterol and liver enzymes
4. Mosquito repellant and larvicidal actions particularly of seeds
ORIENTIN AND VICENIN
It is significant in giving protection to human lymphocytes against the clastogenic effect of radiation at low, non toxic concentrations.

URSOLIC ACID: (Pentacyclic triterpenic acid) it is a potent COX-2 inhibitor, anti cancer activity and can inhibit Adriamycin induced lipid peroxidation.

ROSMARINIC ACID: It has anti-inflammatory & antioxidant activities.[4] It is also potential anxiolytic as it acts GABA transaminase inhibitor.

OLEANOLIC ACID OR OLEANIC ACID
They cause induction by IFN of inducible Nitric oxide synthtase and of Cyclooxygenase – 2 in mouse macrophages.

LINOLEIC ACID: It is essential fatty acid which is popular for preventing and treating diseases of the heart & blood vessels.[5]

CARYOPHYLLENE: It is a Sesquiterpene. Anti-inflammatory, and local anaesthetic, antitumor. Others are β pinene, β– Elemene etc.

These pharmacologic agents are very much useful for treating and preventing dental disorders. In fact Tulasi has been used as expectorant, analgesic, anticancer, antiasthmatic, antiemetic, diaphoretic, anti diabetic, antifertility, hepatoprotective, hypotensive, hyolidipimic and antistress agent. [6]

Various dental uses
1. Tulasi leaves are quite effective as antibacterial, so approved as food additive by FDA. [7] These can be helpful in treating common oral infections. To name some of them are as Carracrol and Tepene & Sesquiterpene, β caryophylline. Proper Oral hygiene can be maintained with regular chewing of these leaves.

2. Ocimum sanctum leaves contain 0.7% volatile oil comprising about 71% eugenol and 20% methyl eugenol. Due to significant amount of Eugenol (1-hydroxy-2 methoxy-4 allyl benzene) Tulasi is a strong COX-2 inhibitor. This anti-analgesic property of Tulasi is utilized in treatment of dental and mucosal pain. This can be attributed to inhibition of both the Cyclooxygenase and the Lipoxygenase pathways of Arachidonic acid metabolism. [8]

3. Powdered Tulasi leaves mixed with mustard oil can be used as toothpaste for tooth brushing. The powdered Tulasi leaves used to encounter halitosis and maintaining good oral health. Massages with Tulasi powder have reported to be highly effective in many gingival and periodontal diseases. [7][8]

4. Antifungal Activity. In a study conducted by Khan A et al, it was concluded that Linalool and Eugenol which are present in essential oil extracted from Tulasi are effective against two strains of candida (C. albicans and Candida tropicalis) but Linalool is more effective than Eugenol against candidiasis.[9]

5. Immunomodulatory Effect: Tulasi have property of immune-modulation, so can also acts on skin and hemopoetic tissues. So the Tulasi can be used in treatment of oral lichen planus, Pemphigous etc. However further studies are needed to evaluate efficacy of Tulasi in treatment of oral lichen planus.[10]

6. Anti precancerous lesion: Tulasi can also be used as antioxidant therapy in both leukoplakia and oral submucous fibrosis. The polyphenol rosmarnic acid is a strong antioxidant present in Tulasi. So it can be used in treatment of all other oral precancerous lesions and condition. [11]

7. Anti Ulcer: The anti inflammatory and immune-modulatory effect helps in curing gastro-intestinal ulcer. That is very helpful in Apthous ulcer and Pizza burn type ulcer in oral cavity. [12]

8. Nutritional supplement: It contains various vitamins like A,C,D,E,K. Which are necessary for any nutritional disorder like diabetics, Avitaminosis etc. [13]

9. Periodontal disorder: Powdered Tulasi leaves can be used for brushing, gum massage for healthy gum and curing Gingivitis. Mouth rinse prepared by various dilution from leave extract has been found to be equally effective compared to Chlorohexidine mouthwash 0.12%.[14]

10. As a root canal irrigant: A study by Subbyya et al concludes that the ocium sanctum leave extracts are very much effective against E.fecalis, the root canal pathogen. [15,16] From an in vivo study by Prabhakar AR et al it has been concluded that in Pedodontics also 4% Tulasi extract can be considered as a potential irritant.[17]

CONCLUSION
The Holy Basil (Ocium sanctum) has been proven to be curative of various systemic disorders. It can be used as anti hypertensive, anti diabetic, stress relieving agent, Syndrome X, anti cancer, anti-inflammatory etc. This promising herb has been used in dentistry for various purposes. So it is the time we can go for phase 2 or phase 3 clinical trials for the curative & preventive action. Most of the dental diseases are infectious and inflammatory. Thus it gives the promising action of the wonder herb Tulasi.

Indian science since the ancient era has proven the use Tulasi for oral diseases, so for dental purpose many studies are required to have a factual answer of some unanswered questions like side effect. The postgraduate and under graduate student should have a curriculum such that, this will promote the Indian Ayurvedic science and ancient Indian text for the use of the Holy Basil in dentistry.

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