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Nature's Recipe for Oral Health.

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ABSTRACT

Phototherapy is used as an additional therapeutic method for treatment of various oral diseases. Besides its therapeutic effects, it has a role in improving general health and immunity. Herbs and their extracts have antimicrobial, anti-inflammatory, anti-oxidative, analgesic, anti-cryogenic and ant carcinogenic effects. Aim of this review article is to give a basic overview on the various available herbal species that can be used for treatment of oral diseases. This review will help clinician and researcher to search and select the plant for developing effective medication for maintaining cost effective oral care.

Keywords: Herbs, Gingivitis, Periodontitis, Oral health.

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INTRODUCTION

Oral health is integral to general well-being and relates to the quality of life. The relationship between the oral diseases and the activity of the microbial species are established. Over 750 species of bacteria inhabit the oral cavity (50% of which are not yet to be identified) and a number of these are implicated in oral diseases. The global need for alternative prevention and treatment options and products for oral diseases that are safe, effective and economical comes from the rise in disease incidence(particularly in developing countries), increased resistance by pathogenic bacteria to currently used antibiotics and chemotherapeutics, opportunistic infections in immune-compromised individuals and financial considerations[1]. In developing countries like India, there are different systems of medicine like Allopathy, Ayurveda, and homoeopathy, Naturopathy, Sidda, Unani and Yoga [2]. Ayurveda is a medical system primarily practiced in India that has been known for nearly 5000 years recommends a combination of lifestyle management and treatment with specific herbs to cure various diseases [3]. There are approximately 1250 medicinal plants being used in formulating beneficial measures [4]. Herbal medicines are being used increasingly as dietary supplements to fight or prevent common diseases [5]. They are both primitive and preventive in its approach. It is a comprehensive system, which uses various remedies derived from plants and their extracts to treat disorders and to maintain good health [6]. Herbs and their extract are used to stimulate superficial circulation, increase elimination of harmful substance and reduce inflammation and irritation. Herbal products may be used as pills, syrup, and infusions or externally as creams, ointments and liniments [7]. The World Health Organization estimates that about 80% of the population living in the developing countries relies almost exclusively on traditional medicine for their primary health care needs. Conventional drugs usually provide effective antibiotic therapy for bacterial infections, but there is an increasing problem of antibiotic resistance and a continuing need of new solutions [5]. Today's dentists are practicing in an era where the patients are more concerned about both their oral health and whole body health, herbal medicines with their 'naturally occurring' active ingredients offer a gentle and enduring way for restoration of health by the most trustworthy and least harmful way[6]. Hence, nowadays, natural compounds contained in the herbal cocktail can act in a synergetic manner within the human body and can provide unique therapeutic properties with minimum or no undesirable side effects [8].

Allium Sativum:

Alliums stadium, commonly known as garlic, is a species in the onion genus, Alliums. Aqueous extracts of garlic has antibacterial effects against a wide range of gram positive organisms, Gram negative organism, fungi including multidrug resistant enter toxic genetic strains of Escherichia coli hence used for management of dental infections like periodontitis[9,10,11]. Garlic juice has shown impressive inhibition of streptococcus mutants isolated from human carious teeth considering that this micro-organisms resistant to antibacterial agents such as penicillin, amoxicillin, tetracycline and erythromycin [12, 13]. Despite the antibacterial effects of garlic extract, side effects are unpleasant taste; halitosis and nausea were reported [14]. However, the efficacy of garlic juice is higher than Chlorhexidine against target bacteria and could be used as an effective mouthwash. A mouth wash containing 10% garlic in quarter ringer solution produced a drastic reduction in the number of oral bacteria [15].

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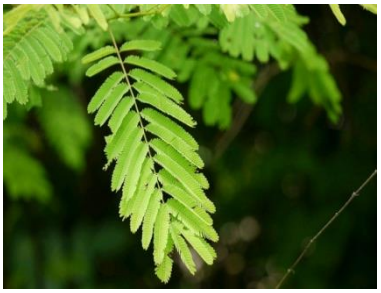
Azadirachta Indica (Neem):

It has wide range of antimicrobial activity. Neem stick extract has the property of reducing the ability of some streptococci to colonize tooth surface [16]. Extract of Neem leaves has antiviral activity against HSV (HSV1 HSV2) [17]. Antimicrobial effect of Neem extract has been demonstrated against S. Mutants [18]. Neem consists of genie, sodium nominate, salami, nimbi, azadirachtin, nimbidiol, quercetin and nimbi din. Neem leaves contain fiber, carbohydrates, and at least 10 amino acid proteins, calcium, arytenoids, fluoride. Neem has antifungal, antiviral, antibacterial, antipyretic, anti-inflammatory, anticariogenic, anti-carcinogenic, antihelminthic, analgesic and anti-oxidant. Studies have shown that neem is used in the treatment of dental caries, gingivitis and periodontitis [19, 20, and 21].

Acacia Catechu:



Acacia catechu wild. (Family: Fabaceae and subfamily: Mimosoidea) is widely used in Ayurveda for many diseases. Acacia catechu heartwood extract is found to be an effective antibacterial agent. A study conducted in ethanol and aqueous heartwood extract of Acacia catechu proved its efficacy as a potent anti bacterial agent [22]. Acacia catechu heartwood extract on dental caries causing microbes and organism associated with endodontic infection like streptococcus mutants, streptococcus salivations, Lactobacillus acidophilus and Enterococcus facials using disc diffusion method [23].

Acacia Arabica:

This evergreen tree is commonly found in dry forest area. In a clinical trial with gemstone showed significant clinical improvement in gingival and plaque index scores as compared to a placebo gel Gemstone gel was not associated with any discoloration of teeth or unpleasant taste [24].

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Chamomile (Matricaria ricotta or Matricaria chamomile):

Chamomile (Matricaria ricotta) belongs to Asteraceae family and it is one of the most popular herbs. It is used as ingredient of mouth rinse and in prevention and treatment of gingivitis and periodontal disease. It can also be used in the form of capsules, tablets or tinctures. McKay and Blumberg [25] demonstrated anti-inflammatory activity in an animal model study. Lucian et al [26]. found a reduction in the gingival bleeding index, confirming the findings of this study, in which mouthwash with Matricaria ricotta extract also reduced the bleeding index, both in gingivitis and in chronic periodontitis, showing statistically significant results ($p<0.05$) in the different assessment periods. Batista et al [27] and pomegranate extracts mouthwashes, which were effective in reducing gingival bleeding in periodontal disease, suggesting that both extracts have anti-inflammatory and antimicrobial actions similar to those of the Chlorhexidine 0.12% and thus can also be used as additional therapeutic agents to re-establish and maintain periodontal health. There have been reports of allergic reactions to chamomile. These reactions were followed by bronchial constriction with systemic administration and skin reactions after topical application [28].

Syzygium aromatic (Clove):

Clove essential oil has a safety record a mile long with documented use as a breath freshener as early as the 3rd century B.C. by Chinese emperors. Ancient Hindu texts have described the use of clove oil in dentistry. Avicenna, teacher of Hippocrates (the Father of Medicine), treated rotting teeth and gums with pills of clove oil. Since the 19th century, the germ-killing molecules in clove oil have functioned for root canal treatment and other more serious dentistry. The molecule named eugenic in clove is essential oil has analgesic and antiseptic properties and particularly inhibits growth of nearly all disease-causing bacteria while leaving the beneficial bacteria unharmed [29]. It has been used in the dental fillings and dental cements for many years for their topical analgesic properties. The eugenic and other constituents of clove, such as vanillin and iso-eugenol, have also been reported to have antimicrobial effect [30]. Clove gel can provide dentists with an alternative to benzocaine for topical anesthesia and in their daily practice, especially for use with children and in areas where cost and availability limit access to pharmaceutical topical anesthetics [31, 32].

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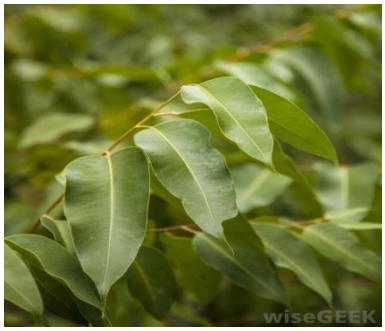
Eucalyptus:



Eucalyptus is a native to Australia and is a widely planted genus. A eucalyptus globule is a representative of Eucalyptus species. Its leaf is used for medicinal purposes and as a food source, e.g., tea, natural additives, and health foods. Ethanol extracts from E. globules leaves reportedly possess antibacterial activity against various bacteria, including oral bacteria [33, 34]. The extracts exhibit potent anti-bacterial activity against cryogenic bacteria, such as streptococcus mutants and streptococcus sopranos; additionally, the extracts inhibit insoluble glean synthesis by extracellular glucosyltransferase from S. sopranos. Moreover, 60% ethanol extracts from the E. globules leaf displayed anti-bacterial activity against several periodontopathic bacteria, including Porphyromonas gingivalis and privately intermediary. Among periodontal bacteria, the growth of p. gingivalis was strongly inhibited even with a low concentration (10 mg/ml) of eucalyptus extracts [35].

Zingier officinal is (Ginger):

The various components of ginger are 1-4% essential oil and an oleoresin, zingiberene, curcumin, sesquiphellandrene, bisabolene. Monoterpene aldehyde and alcohols are also present. It has antibacterial, anti-inflammatory, analgesic property. It is used to relieve toothache, as a sialogog, in the treatment of oral thrush. Ginger may reduce the toxic effects of the chemotherapeutic agent cyclophosphamide. It should not be used in pregnancy and patients with billiard disease because ginger can interfere with the blood clotting, it should be used cautiously in patients on anticoagulant therapies such as Coumadin or heparin [36, 37, 38].

Salvadoran Persia (Miwok):

The most common type of chewing stick, Miwok, is derived from Ark tree that grows mainly in Saudi Arabia and also in other parts of the Middle East. Miwok is a chewing stick used by many people of different cultures and in many developing countries as a traditional toothbrush for oral hygiene. The religious and

spiritual impact of Miwok probably is the principal reason for using it in Islamic countries and mostly by Muslim population. The Miwok extract has also found its way into the dentifrices in the recent years as ant plaque and ant gingivitis agent. A study was carried out to evaluate the ant plaque efficacy of a commercially available Miwok containing dentifrice compared to conventional dentifrice using a randomized, triple-blinded, parallel design method. The results showed comparable effects of Miwok with that of the conventional dentifrice [39].

Radix Ginseng (Ginseng):

Chemical constituents of ginseng include triterpenes, saponins and oleanolic acid. It is antihelminthic, analgesic, antispasmodic, antimicrobial, anti-inflammatory, antipyretic, immunostimulatory, antiulcer property and used in periodontitis. Adverse effects with its use are hypertension, nervousness, irritability, diarrhoea, skin eruptions and insomnia [40, 36, 38, 41, and 42].

Camellia Saneness (Green Tea):

Green tea contains polyphone contents comprising catching(C), epicatechin (EC), gallocatechin (GC), epoigallocatechin (EGC), epicatechin gallant (ECG) and epigallocatechin gallant. It is anti inflammatory, antibacterial and antiviral. Used in the treatment of periodontal disease [43, 20, 42, 44].

Horsetail (Equisetum):

The prehistoric horsetail plant is rich in healing and is commonly used to reduce fever. It also has anti-inflammatory properties, stops bleeding, and repairs damaged tissues. Use of horsetail mouthwash relieves mouth and gum infections [45].

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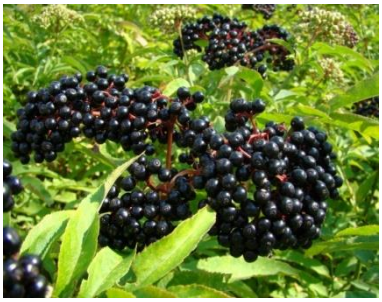
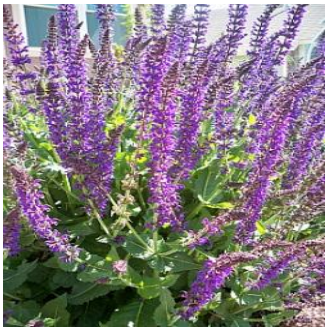
Elderberry (Sombrous):



The small edible fruit of the elder -a plant grows in damp ground. Elderberries are rich in vitamin C. The dark purple berries are often used to make wine or preserves and have traditionally been used to treat colic, diarrhoea, rheumatism, coughs and colds [46].

Sage (Salvia officinal is):



Sage belongs to Laminaceae family. Sage grows in the fields and along roadsides. It can be used as mouth rinse and it has been recommended for treatment of sore throat, steatites, gingivitis and periodontal disease [47]. Sage essential oils have antibiotic, antifungal and antiviral properties and it has been used to reduce inflammatory process in steatites and pharyngitis [47]. Histories et al [48]. Have reported a significant reduction in gingival inflammation and it contains following herbal species: Salvia officinal is, Menthe pipefitter (menthol), Matricaria chamomile, Commiphora myrrh, Carom carve (Umbelliferae), Eugenia caryophyllus (Myrtaceae) and Echinacea purported. Salvia officinal is has aromatic, spasmolytic, antiseptic, astringent properties and when it is taken as a mouthwash, salvia deals effectively with throat infections, gingivitis and mouth ulcers [49]. Drinking sage tea is not recommended during pregnancy and lactation but mouth rinse and gargling is allowed [40].

Turmeric (curcuma long):

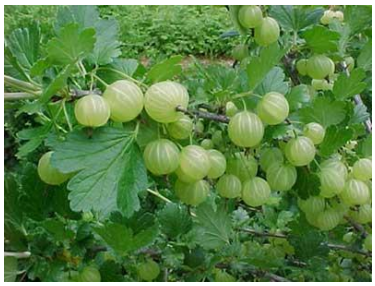
It is the most extensively used spice. It has potent anti-inflammatory and strong anti-oxidant properties. Anti-oxidant activity is due to curcumin [50]. Studies have shown that it stimulates detoxifying enzymes that is Glutathione S Transferees and UDP glucoronyl transferees [51]. Turmeric may act as anti-proliferators and anti-promoter [50]. It has anti-inflammatory, anti-oxidant, ant carcinogenic, anti-mutagenic,

anti-bacterial, anti-fungal, anti-viral activities [52]. Its anti cancer effect is mainly due to induction of apoptosis [50]. It inhibits Streptococcus and Lactobacillus [52].

Melaleuca alternifolia (Tea Tree Oil):

It is more commonly known Australian tea tree oil as, is a native Australian plant with many properties such as being as antiseptic, an antifungal agent and a mild solvent. Tea tree oil's major active component is terpinen-4-ol (30-40%). This compound is responsible for its antibacterial and antifungal properties [53]. Tea tree, and in particular its essential oil, is one of the most important natural antiseptics. It is useful for treating throat irritation, stings, burns, wounds and skin infections of all kinds [53]. It stimulates the immune system and is effective against a broad range of bacterial and fungal infections. This essential oil is non-irritant. Using tea tree oil orally is not recommended as it may cause possibly serious side effects such as confusion, loss of muscle control, or coma. In dentistry, tea tree oil has been used to destroy micro-organisms in the mouth before dental surgery, removal of smear layer when used as a root canal irritant and to relieve mouth soreness caused by dental procedures [54-57]. In studies of patients who suffered from oral candidacies mouth rinses containing tea tree oil has shown some effectiveness in reducing symptoms when taken in a dose of one table spoonful of 5% tea tree oil solution as a mouth wash that is held in the mouth and then spit out four times a day for up to 4 weeks [58, 59].

Triphala:



Triphala is a compound form of three herbs like fruit of embolic officinal is, terminally Billerica and terminally chebula [60]. Triphala is a combination of amalaki, haritaki and bibhitaki.Amalaki contains ascorbic acid, thiamine, riboflavin and niacin. It comprises beta-sit sterol, Gallic acid, pelagic acid, ethyl gallant, alloy glucose and chebulagic acid. Haritaki contains chebulagic and chebulinic acid as well as corilagin. It is an antioxidant, antimicrobial. Used in dental caries, bleeding and ulcerated gums [43].

Osmium Sanctum (Tulsi):

Tulsi in Sanskrit means ''one that is incompatible or matchless''. Botanical name is Osmium Sanctum. Tulsi was recognized thousands of years ago as one of the India's greatest healing herb. Tulsi was then established as one of the eight indispensable items in any Vedic worship. It is found almost in every house in India and is readily found now even in the West and therefore one of its names is Sulabha 'the easy obtainable one' [61]. It is an erect soft, hairy aromatic herb or under shrub found throughout India. It is commonly cultivated in gardens. Two types of Osmium sanctum are met within cultivation: (I) Tulsi plants with green leaves known as 'Rama or Sheri Tulsi' and (ii) Tulsi plant with purple leaves known as 'Shame or Krishna Tulsi'.

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Both of these are used for medicinal plants for various ailments [62]. Several medicinal properties have been attributed to Osmium sanctum. Different parts e.g. leaves, flowers, seeds, stem, roots etc. are known to possess therapeutic potentials and have been used by traditional medicinal practitioners as expectorant, analgesic, anti-cancer, anti-asthmatic, antiemetic, diaphoretic, anti-diabetic, hepatic-protective, hypotensive, Hypolipidemic and anti-stress agents. Tulsi has been used in the treatment of fever, bronchitis, arthritis, convulsions etc [63]. Tulsi leaves dried in sun and powdered can be used for brushing teeth [64]. It can also be mixed with mustard oil to make a paste and used as toothpaste. Tulsi has also proven to be very effective in counteracting halitosis. Its anti-inflammatory property makes it a suitable remedy for gingivitis and periodontitis, and it can be used for massaging the gingival [65].

CONCLUSION

Over the past decade, herbal and ayurvedic drugs have become a subject of world importance, with both medicinal and economical implications [66]. The global need for an alternative prevention, treatment options and products for oral disease are safe, effective and economical arises due to the rise in disease incidence, increased resistance by pathogenic bacteria to currently used antibiotic [67]. Phototherapy, as additional therapeutic method, has been expanding rapidly, conquering the whole world. Herbs and their extracts have been used as adjuvants in periodontal treatment because they reduce inflammation and act as antioxidants and antibiotics. The usage of herbal products in periodontal treatment has a great potential, but it is a challenge to determine the proper combination of herbal species and their extracts. Hence, long-term clinical studies are recommended to the scientific community for making Ayurvedic products as part of regular dental practice.

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