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Review Article

Medicinal plants in dentistry- A brief review

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ABSTRACT

Finding healing powers in plants is an ancient idea. These form the basis for the development of new chemicals for pharmaceuticals and also the use of this readily available, natural and safe resources as a part of dental practice has a great potential for more green and natural dental practice. Several scientific investigations have highlighted the importance and the contribution of many plant families. Plants belonging to the following Asteraceae, Liliaceae, Apocynaceae, Solanaceae, Caesalpinaceae, Rutaceae, Piperaceae, Sapotoceae are also used as medicinal plants. Plants play a vital role for development of new drugs. The bioactive extract should be standardized on the basis of active compounds and should undergo limited safety studies. This article provides a gist of all the valuable medicinal plants that can be used in dentistry for different curing and remedial procedures.

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1. Introduction

A person's overall wellbeing is greatly influenced by plants. People all throughout the world regularly utilize plants to cure and prevent a wide range of illnesses. The key to a healthy existence for humans is good oral and dental hygiene. In contrast to synthetic drugs, using herbal extracts and their products in daily life is a promising and intriguing alternative to control oral disorders. Hence, phytodentistry is the practice of utilizing dental plants, and herbs to cure dental diseases.[1]

The term "phytodentistry" refers to the practise of directly or indirectly treating disease with plants and plant-derived compounds. The study of using plant extracts in therapy is known as phytotherapy. The use of phytotherapy in the treatment of stomatological issues is essential. Nature has always served as a shining example of the remarkable phenomenon of symbiosis. The foundation for treating human illness has always been natural materials derived from plants, animals, and minerals.[2] According to current estimates, 80% of people in underdeveloped nations still rely on traditional medicine, which is mostly focused on plant and animal species, for their primary healthcare.

The demand for herbal medications is currently high, and their acceptance is growing daily.800 plants have been employed in indigenous medical systems, and approximately 500 plants with therapeutic uses are documented in ancient literature. India is home to an enormous collection of medicinal plants that are employed in conventional medical procedures.[3]

The natural phytochemicals hold promise as a potent antibiotic substitute as well as a promising strategy to treating and preventing dental caries and other oral infections.

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2. History of Phytodentistry

It began with the usage of miswak (a chewing stick), and many regions of the country still use it today as herbal toothpaste. Hippocrates listed between 300 and 400 therapeutic plants in the late fifth century BC.[3] Dioscorides published De materia medica in the first century AD, which served as the model for contemporary pharmacopoeias. A Sumerian clay slab from Nagpur, which is about 5000 years old, contains the oldest recorded evidence of the use of medicinal plants for making medications. The bible contains descriptions of 30 healing herbs.[4] It had 12 drug preparation techniques referencing more than 250 different plants, some of which contained alkaloids including poppies, henbane, and mandrake. About 30 medicinal plants are described in the Bible.[5]

A vast collection of medicinal plants utilized in conventional medical treatments may be found on the Indian subcontinent, which is also a great source of knowledge. Several plant species are used by the various indigenous medical systems, including Siddha, Ayurveda, Unani, and allopathy, to treat various illnesses. Over 500 traditional groups in India use about 800 plant species to treat various diseases, even though there are about 20,000 medicinal plant species in the country.[6] In this sense, India occupies a special place in the globe, where several recognized indigenous medical systems, including Ayurveda, Siddha, Unani, Homoeopathy, Yoga, and Naturopathy, are used to treat patients.[2] India is known as the world's botanical garden and is the country that produces the most medicinal herbs.[7]

Using plants as a source of direct medicinal substances, which Gurib-Fakim claims are important for modern medicine, is one of the four main ways that indigenous peoples use plants.

Plants can provide chemicals that can be utilized as models for novel synthetic compounds. These are also employed as sources of starting points for the elaboration of semi-synthetic compounds. As taxanomic markers for the discovery of novel chemicals, plants can also be used.[8]

The traditional Indian system of health care and longevity is known as ayurveda. A holistic picture of man's health and illness is involved. The goal of ayurvedic medicine is to treat the patient as an organic whole, and it entails the prudent use of medications, diets, and specific practises. There are around 1,250 medicinal plants in India that are employed in Ayurvedic or other ethnic remedies.[1]

Dant Dhvani - Since the beginning of time, dant dhvani has been employed as a viable and efficient oral cavity cleaning. Researchers also reported that using it on schedule, both in the morning and the evening, can increase salivation and level the occlusal surface.[2] It is also reported to have antibacterial properties, so we can say that it has good and potential benefits for oral health for the entire community, and in areas where it is available, it is a cheap way to keep the oral cavity free of bacteria. However, it shouldn't be the only tool used for brushing teeth. As a result, it has the ability to reduce plaque development while also reducing caries.[8]

Jivha Lekhana - Regular tongue scraping is said to be a helpful habit for keeping your oral cavity clean since it avoids the development of pellicle, or a layer, which could cause halitosis.[2] Any specific tongue scraper, whether metallic or made of copper, can be used for this practice of tongue scraping.[8]

Gandusha- Oil pulling is a fairly uncommon behaviour that has been practised by a small portion of the population. In essence, the mouth cavity is swished with this oil. This habit can be used when one first awakens in the morning. There are numerous brand-name products available today that are a combination of different sorts of oils, and this practise is known to affect not only oral health but also systemic health. The type of oil that can be utilised can be any form of oil, be it sunflower oil or sesame oil.[8]

3. Classification of Herbs

Based on the variety and evolution of these plants, these were categorised according to WHO standards.[9]

Category 1 consists of regional herbs that are consumed by the neighbourhood and that have been passed down through the generations.

Category 2: tried and tested herbs that have been put through experiments and have also been adopted by other nations.

Category 3: Products that have undergone modifications to meet changing dietary and medication requirements.

Category 4: Importing herbal products that are raw in nature falls under category 4.

The National Institutes of Health (NIH) transferred all private information pertaining to this branch of medicine to the National Centre for Complementary and Alternative Medicine (NCCAM).[9]

Category 1 includes the four branches that have connections to both western and non-western nations. those that fall within the naturopathic and homoeopathic categories.

Category 2: The practises in category 2 are those that have something to do with healing. There are several ways to pray and use medications to bring about this healing.

Category 3: The medications in category 3 are those with a propensity to promote healing due to their therapeutic nature.

Category 4 is made up of those who work to relieve pain in the bones and promote healing through massage.

Category 5**-** The therapies associated with using energies to bring about healing, such as reiki or pranic healing, as well as those biomagnetic resonance fields, fall under category 5.

Application of Plants in Dentistry: Phytodentistry

The use of natural phytochemicals as an antibiotic substitute has promised and offers a viable alternative for treating and preventing oral infections. The term "phytodentistry" refers to the use of plants and plant-derived products to treat or prevent oral disorders.[2]

Application of Plants in Medicine: Phytomedicine

The practice of using plants and herbs to treat and prevent human illness is known as phytomedicine. Since long before recorded history, humans have employed plants for therapeutic purposes.[4]

4. Future Perspective of Medicinal Plants

The foundation for treating human illness has always been natural materials derived from plants, animals, and minerals. According to current estimates, 80% of the population in underdeveloped nations still relies on traditional medicine, which is mostly based on plant and animal species, for their basic healthcare.[13] The demand for herbal medications is currently high, and their acceptance is growing daily.

According to estimates, the market for ayurvedic drugs is growing at a 20% yearly rate. In India, sales of medicinal plants have increased by around 25% during the last ten years. India employs 7000.[14]

Alternative medicine, novel medications, and healthcare items have all been developed from traditional medicine.[2] The use of medicinal plants as starting materials for the manufacture of medications or as models for chemical compounds with pharmacological activity is crucial for pharmacological research and drug development. This is true not only when plant ingredients are used directly as therapeutic agents.[15] Several pharmacopoeias from around the world have published monographs that list the parameters and standards for numerous herbs and some products manufactured from these herbs. Numerous pharmacopoeias are there to guide through the identification of compound medicines which includes:[16]

1. Pharmacopoeia Committee
2. Chinese Herbal Pharmacopoeia
3. United States Herbal Pharmacopoeia
4. British Herbal Pharmacopoeia
5. British Herbal Compendium
6. Japanese Standards for Herbal Medicine
7. The Ayurvedic Pharmacopoeia of India (API)

These Pharmacopeias lay down monograph for herbs and herbal products to maintain their quality in their respective nations. Government of India too has brought out Ayurvedic Pharmacopoeia India, which recommends basic quality parameters for eighty common Ayurvedic herbal drugs.[17]

5. Conclusion

Various plant species have been used different indigenous systems including Siddha, Ayurveda, Unani and Allopathy

Table 1: Application of plants in different departments of dentistry.

Departments	Application of plants
Oral medicine[10]	**Various plants are used to treat oral mucosal lesions such as l**eukoplakia, erythroplakia, oral submucous fibrosis, actinic cheilitis, and oral lichen planus **Bacterial infections** - Echinacea has been used to treat infections and wounds for many years. Ocimum sanctum (Tulsi), Origanum majorana (Ram Tulsi), Cinnamomum zeylanicum (Dalchini) and Xanthoxylum armatum (Timur) for potential antibacterial activity against numerous medically important bacterial stains. **Fungal infections** – spicata, N.Sativa, and R.officinalis are the most effective plants on dermatophytes. Many of the sulfuric compounds, phenolic compounds, flavonoids, tannins and anthocyanins in plants cause antifungal effects. **Dental traumatology**
Periodontology[11]	**Mouthwashes (Adjunct therapy)** – Myrrh tincture is used for inflammations of gums and oral mucosa. Herbal mouthwash containing extracts of Baccharis dracunculifolia as agent for the control of biofilm. Most used herbs are Bloodroot, caraway, chamomile, Rosemary, Sage, Thyme, Aloe vera, Propolis. **Dentifrice (Adjunct therapy)-** Neem is the ultimate herbal ingredient. Similarly, Peelu has long been known as a toothbrush tree.
Oral surgery[10]	**Hemostatic agents (Wound healing) –**Examples include Yarrow, Shepherd's purse, witch hazel, Astragalus, goldenrod, grape seed, turmeric and tienchi ginseng.
Prosthodontics[11]	**Herbal based dental materials** –Zinc oxide eugenol Cement (Citric acid) Impression materials (CMCP) Gutta percha (Thymol) Various herbs that are widely used in prosthetic materials are aloe vera, clove, eucalyptus, peppermint, and turmeric.
Conservative and endodontics[12]	**Irrigants** –Neem, tulsi, aloe vera, Morinda citrifolia, curcum longa. **Intracanal medicaments** – Poplars, conifers, and generic clusia flowers are prime sources. The efficacy of propolis as an intracanal medicament against Enterococcus faecalis. **Pulp capping agents-** most of the herbs are used in direct as well as indirect pulp capping**.** **Retreatment agents –** clove and clove oil are used**.** **Dental caries prevention -** chewing on the leaves and steams of the following herbs: basil, cilantro, parsley, peppermint, spearmint, and thyme causes cleaning of mouth and gums thus preventing bacterial outgrowth on the tooth, leading to prevention in dental caries.

for treatment of numerous diseases. A Single herb shows a variety of effects like anti-inflammatory, anti-bacterial, anti-fungal activity and many more. These herbs are classified as per WHO on variety and evolution. Hence the incorporation of these herbs in dental practice will prove to be a valuable adjunct in dental treatment. Various herbs such as Tulsi, Myrrh, Bloodroot, caraway, chamomile, Rosemary, Thyme, Aloe vera, propolis, neem and peppermint etc are used in dental practice in the form of mouthwashes, dentifrices, intracanal medicaments and irrigants.[18] Moreover, a few herbs are also used in caries prevention and as hemostatic agents. Despite of availability of herbal plants in abundance, its applicability and introduction in dentistry still needs to be flourished.

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7. Conflicts of Interest

There are no conflicts of interest.

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