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APPLICATION OF ETHNOMEDICINE IN DENTISTRY – A REVIEW

Harsh Mahajan [1], Sunil Mishra [2], Hazari Puja [3], Shivangi Mahajan[4]

[1,2] Reader, [3]Sr.Lecturer, [4]Private Practicioner;

Department of Maxillofacial Prosthodontics and Implantology, Peoples Dental Academy, Bhopal, Madhya Pradesh, India

ABSTRACT

Background: Ethnomedicine is the study of traditional medicines. It is practiced by many traditional groups and has related written sources and also the knowledge and practices have been verbally transmitted over the centuries by various ethnic groups and mainly by indigenous peoples. **Purpose:** Despite vast progress in the field of medical science, nowadays research in drugs derived from plants are gaining popularity due to various side effects and complications of chemical and synthetic drugs. Incidence of multidrug resistant bacteria also sparks scientists on the research for plant based antimicrobial agents. Plants have been shown to contain various phyto-chemicals which have curative, sedative and defensive properties. This article will review various medicinal plants and products along with their therapeutic applications used in dentistry. **Material and Methods:** An electronic search was performed using Pubmed, Medline and Ebscohost database. The search is focused on ethnomedicine in dentistry**.** Articles published in English were only included in the review. At first the titles and abstracts related to the topic were searched and literature that fulfilled the required inclusion criteria was selected for review. **Result:** An extensive search of literature on Ebscohost and Pubmed database had identified 100 articles out of which 52 relevant articles of ethnomedicine in dentistry were selected and included in this review article. **Conclusion:** Plants have been shown to contain various phyto-chemicals which have curative, sedative and defensive properties in dentistry. More clinical studies and more research on the safety, related side effects and efficacy of herbal medicines are still required.

Key words: Propolis, Ethnomedicine, Aloevera, Herbs

INTRODUCTION

In major parts of the world plants are used as medicine. In rural areas medicinal plants are still the major source of primary health care. For the primary health related needs 80% population depends on herbal medicine as reported by the World Health Organization (WHO).[1] In the developed countries, 25% of the drugs are based on herbs and their derivatives. [2] Due to various side effects of the conventional drug therapies and incidence of multi drug resistant bacteria the research of plant based antimicrobial agents are gaining a wide popularity nowadays.

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Herb is the plant in which woody tissue is deficient. In oral diseases herbs are very efficient mode of treatment for different disease. Herbal preparations are obtained from different parts of the plant such as flowers, seeds, leaves etc. This review article will summarize various articles on medicinal herbs which are useful in dentistry as a substitute to allopathic medicines. Review of various studies or articles on application of medicinal plants in dentistry were tabulated in Table 1. [3-31]An extensive search of literature on Ebscohost and Pubmed database had identified 100 articles out of which 52 relevant articles of ethnomedicine in dentistry were selected and included in this review article.

Objectives

• To evaluate various medicinal herbs used in dentistry

• To analyze the efficacy of various medicinal herbs on the periodontium and other oral conditions

Inclusion Criteria:

1. Research articles original in nature.
2. Articles related to herbs on which Review was done.
3. In vivo and In vitro studies

Exclusion Criteria:

1. Articles before year 2000.
2. Articles whose abstracts are only readable.

Role of Herbs in Dentistry

In the last few years in the field of dentistry there has been a marked increase in interest in the drugs derived from the plants. Literature also shows that there are many plant species which have the potential to be used as an alternative to conventional drug therapy. There are many disadvantages of the antimicrobial and pulp therapeutic agents which are used nowadays like immune suppression, hypersensitivity, allergic reactions, and resistance of many microorganisms to these drugs.[32] Therefore there is a vast scope of plant species which has therapeutic properties. Therapeutics products which are based on Plants has less side effects and they are non-toxic, positively bio-degradable and less expensive. [33]

Aloe Vera (Emblica officinalis)

Many researchers have shown that aloe vera is useful in treating apthous ulcer, lichen planus and alveolar osteitis.[34,35] It also has inhibitory effect on *Streptococcus pyogens* & *Enterococcs faecalis*.[8,32] It is also has anti-inflammatory property which is useful in treating plaque induced gingivitis. For the cure and prevention of caries and disease related to gingiva and periodontium it can be used as antiseptic.[18] Many research on aloevera has shown positive effect in treatment of periodontal pockets as they can be used locally.[46,47]

Neem (Azadiracta indica)

Many researchers have shown that neem has anti-microbial activity against *Enterococcus*-faecalis, *Streptococcus aureus and Streptococcus mutans*.[27,28,32,36] It has a potential to be used as a potent intra-canal medicament. Neem extract has good anti-oxidant property. They are useful in treatment of liver diseases and many cancerous lesions and conditions. [36,37]

Triphala

'Triphala' is a well-known powdered preparation. It contains *Terminalia belerica, Terminalia chebula, Emblica officinalis.* Studies have shown that it has anticaries, antioxidant, anticollagenase, and antimicrobial activities.[22] It can be used as a root canal irrigant and mouth wash.[32,38]

Green Tea (Camellia sinensis)

Various studies had done on green tea and it was found that polyphenols in Green tea have good antioxidant, anti microbial, anti-cariogenic and anti-inflammatory property. It has an effective probiotic property.[39,40] It has lot of uses in dentistry as it is an effective anti –plaque and anticariogenic agent due to the presence of fluoride .[32,40] Matsumoto *et al.* studying the antibacterial and antifungal property of grren tea and found that it inhibit the growth of several bacteria and fungi.[41] Sakanaka *et al.* studied the growth of *Streptococcus mutans* and observed that green tea inhibits their growth.[42] These all shows that green tea can be valuable asset in dentistry.

***Tulsi* (Ocimum sanctum)**

Tulsi has antimicrobial property. Study shows that microorganisms such as *Enterococcus*-faecalis, *Streptococcus aureus and Streptococcus mutans* are sensitive to it.[28] Due to presence of anti-oxidant in tulsi, it has been shown to be effective in treatment of oral sub-mucous fibrosis and reduces periodontal tissue breakdown.[18] In oral cure tulsi is widely used, as it kills harmful microorganisms in oral cavity. In the treatment of oral ulcers and oral cancer it efficacy is well known.[48]

Pomegranate (Punica granatum)

Pomegranate (punica granatum) has been shown to be helpful in treating periodontal diseases.[24] Sara tavassoli-Hojjati etal shows that pomegranate juice can be suitable transport media for avulsed tooth.[29]

Curry leaf tree (Murraya koenigii spreng)

Curry leaves have antimicrobial property against *Streptococcus mutans*, and *Streptococcus sanguinis*. It contains sesquiterpenes and monoterpenes oils. It has anti cariogenic property due to chlorophyll present in it. It is used in treatment of dental caries and periodontal diseases.[49]

Garlic (Allium Sativum)

Garlic extract significantly inhibits growth of S.mutant and therefore can be used as an effective treatment option in the control of dental caries. Allicin present in garlic destroys cell wall and cell membrane of root canal bacteria and thus can be used as an irrigant in root canal treatment.[50]

Other Herbs

Herbal agents like propolis, A. vera have healing potential thus making them good pulp therapeutic agents.[43,44] In other study it has also been shown that propolis had an effective antifungal action on *C. albicans* (which is the most common fungus seen in root canals) similar to that of NaOCl. [45]

Studies have found that S. mutans are highly sensitive to Cinnamon oil and hence it can be used in toothpaste and mouth wash as antiseptic agent.[51]

Eucalyptus has antimicrobial activity against S.aureus. It has been reported that chewing gum containing eucalyptus extracts improves gingival health, decreases bleeding during probing and reduces periodontal diseases. [52]

CONCLUSION

Use of herbal medicines in dentistry are day by day increasing and becoming popular among dental practitioners. Herbal medicines are like double edge sword, so a thorough knowledge is very important about its use in dentistry to avoid its misuse. Today herbal medicine should be added in dental curriculum so that dental students and practitioners could aware about the uses and ill effects of it. Further research is on herbal medicines and their role in dentistry in coming future so that it can be used safely in treatment of many dental diseases.

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Table 1: Review of various studies or articles on application of medicinal plants in dentistry

S. No	Author	Year	Medicinal plant tested	Observation	Conclusion
1	Bairy I *et al* [3]	2002	Mangifera indica	Evaluated the anti bacterial effect of mangifera indica on anaerobic microflora in oral cavity.	Mangifera indica posseses antibacterial activity in vivo. The pathogens sush as P.intermedia and P.gingivalis are sensitive to it.
2	Usha C *et al* [4]	2007	Aqueos extract of Terminalia chebula	Effect of an Aqueos extract of Terminalia chebula on salivary samples and its potential use were seen	T.Chebula extract is a potent anticariogenic moutwash
3	Cai X *et al* [5]	2008	Baicalin	Tested the ability of baicalin to influence the progression of experimental periodontitis in rats,	Baicalin protects against tissue damage in ligature-induced eriodontitis in rats, suggesting it a potential therapeutic agent in periodontal disease.
4	Chaturvedi TP [6]	2009	Turmeric	Highlighted the different uses of turmeric in the dentistry along with its medicinal benefits.	In dentistry turmeric has analgesic, antiseptic,anti inflammatory, antibacterial, antioxidant, Anti-tumor, anti-allergic property.
5	Nayak RN [7]	2010	Ganoderma lucidum,	Varying concentrations of aqueous extract of spore powder of Ganoderma lucidum was tested in vitro for its antimicrobi-	Aqueous extract of Ganoderma lucidum exhibited antibacterial activity against the tested organisms.

				al properties against Staphylococcus aureus, Escherichia coli, Enterococcus faecalis and Klebsiella pneumoniae.	
6	Fani M, Kohanteb J [8]	2012	Aloe vera	Studied the activity of aloe vera gel on cariogenicic (S. mutants) Periodontopathic (A. actinomycetemcomitans, P.gingivalis) & oppourtunistic periodontopathogen (B.fragilis).	Aloe vera gel can be used for prevention of dental caries & periodontal disease due to its antiseptic and antimicrobial property.
7	Farina V H *et al* [9]	2012	Curcuma zedoaria and Camellia sinensis (green tea)	Done a study on halitosis control and evaluated the role of Camellia sinensis and Curcuma zedoaria.	Extracts of Camellia sinensis and Curcuma zedoaria had Inhibitory effects on microorganisms immediately so they are used in mouthwashes.
8	Naderi J N *et al* [10]	2012	Anacyclus Pyrethrum	Determine the antibacterial activity of Anacyclus Pyrethrum against oral bacteria, such as Staphylococcus aureus, Streptococcus mutans, Streptococcus sanguis and Pseudomonas aeruginosa.	No significant antibacterial effect found.
9	Yaman E *et al* [11]	2012	Ankaferd Blood Stopper	Done a 12 month follow up study on primary molars and compare the efficacy of formocresol (FC) and Ankaferd Blood Stopper (ABS) as vital pulpotomy agents.	The result showed that FC and ABS can be used as pulpotomy agent.
10	Pratap Gowd MJS *et al* [12]	2012	Clitoria ternatea Linn., and Wedelia chinensis (Osbeck.),	Evaluate the antimicrobial efficacy of medicinal plants in the oral cavity on S mutans, L	Due to antimicrobial property the extracts of three plants were efficient against

			Terminalia chebula Retz.,	casei, and S aureus).	dental caries causing bacteria.
11	Ajmera N *et al* [13]	2013	Aloe vera	Studied the anti inflammatory property of aloe vera containing mouth wash on gingivitis.	In plaque induced gingivitis Aloe vera has noticeable anti inflammatory property and can be used as an replacement to mechanical modes for treating gingivitis
12	Zhou L *et al* [14]	2013	Ursolic acid, Oleanolic acid isolated from many edible & medicinal plant	Studied the role of Ursolic acid, Oleanolic acid on microorganisms causing dental caries.	They had anti bacterial property and help in prevention of dental caries.
13	Doddanna S J *et al* [15]	2013	Leaves of Tea, onion mint, curry and onion bulb.	Evaluate extracts obtained from candida albicans for their antimicrobial property.	The maximum zone of inhibition was shown by Alcoholic curry leaves followed by aqueous tea leaves.
14	de Oliveira *et al* [16]	2013	Equisetum arvense L, Glycyrrhiza glabra L, Stryphnodendron barbatimam Mart and Punica granatum L.	Studied the antimicrobial activity of plant extracts against many microorganisms and analyze the cytotoxic effects of these extracts in cultured murine macrophages.	Among all the plant extracts G. glabra L extract exhibited least cytotoxicity and the E. arvense L extract was the most cytotoxic against microorganisms.
15	Pushpa S, Punneta D *et al* [17]	2013	Morinda Citrifolia	Describe the various aspect of morinda .	Morinda Citrifolia has anti-bactericidal, anti- inflammatory & antioxidant property which can be used in dentistry effectively.
16	Pushpa S *et al* [18]	2013	Tulsi	Carraccol & Tetpene present in tulsi gives anti bacterial property. Anti-oxidants like poly-	Tulsi has anti cariogenic, anti-oxidant, anti-ulceration property hence it is very

				phenol & rosmarinic acid present in tulsi helps in treating Oral Sub Mucous Fibrosis. Volatile oils & methyl eugenol gives analgesic property. Ocimum sanactum gives anti ulceration property.	valuable in dentistry.
17	Pinelli LAP *et al* [19]	2013	Ricinus Communis	In their study they compared the efficacy of Ricinus Communis with Nystatin and Miconazole in denture stomatitis treatment.	Ricinus communis and Miconazole both found to be effective against denture stomatitis in elderly patients.
18	Chaiya A *et al* [20]	2013	Nine herbs such as Terminalia bellirica, Glycyrrhiza glabra and Syzy eum aromaticum etc.	Evaluated the mentioned nine herbs for their effectiveness against dental caries.	The growth and adherence of Streptococcus mutans was inhibited by a .
19	Nagpal M and Sood S [21]	2013	Curcumin	Review the efficacy of turmeric herb in oral cure and maintenance.	Used in different oral treatments such as in periodontitis, oral cancers, dental caries, And for irrigations in oral cavity.
20	Prakash S and Shelke AU [22]	2014	Triphala	Strong inhibitory activity against PMN- type collagenase especially MNP-9. Tannic acid in triphala causes protein denaturation and leads to bacterial cell death. T. belerica present in triphala is responsible for anti- oxidant property. Highly Affective against E.Faecalis.	Triphala has antibacterial, anti-collagenase, anti – oxidant,property. Usefull root canal irrigant.
21	Ferreira Filho	2014	Herbal tinctures	Evaluated the antibac-	Shows significant

	JCC *et al* [23]		of Calendula & Cashew tree	terial activity of calendula & cashew tree against the following bacterial strain: S.Mutants, S.Oralis, S.Salivarius, E.Faecalis & E.Corrodens.	antibacterial activity against several bacterial strains.
22	Prasad D and Kunnaiah R [24]	2014	Punica Granatum	It has anti-bacterial, anti-microbial, anti-inflammatory and anti-viral, anti-cariogenic activity against variety of micro-organisms and viruses. Presence of tannins & polyphenols imparts wound healimg property. Due to presence of tannins which has anaesthetic effect it decreases gag reflexes in soft palate.	It has a potential to be used as a preventive & therapeutic aid to periodontal diseases.
23	Sponchiado Jr EC *et al* [25]	2014	Pothomorphe Umbellata	Assess the antimicrobial activity of Pothomorphe Umbellata against E.Faecalis	Ethyl acetate fraction of Pothomorphe Umbellata was efficient against E.Faecalis in different periods of treatment making this a viable option for endodontic treatment.
24	Shakouie S *et al*[26]	2014	Triphala	Compare the antimicrobial activity of Triphala with 0.5, 1, 2.5 and 5% concentrations of sodium hypochlorite against *Enterococcus faecalis* (*E. faecalis*).	Triphala exhibited better antimicrobial activity against E. faecalis compared to 0.5 and 1% NaOCl
25	Puneetha *et al*[27]	2014	Ginger, neem	Efficacy of ginger, neem and calcium hydroxide	Extracts of Neem and Neem with

				were evaluated against E.faecalis.	Ca(OH)2 posses good antibacterial property against E.faecalis when compare to ginger.
26	Mistry K S *et al* [28]	2014	Neem, Tulsi, Bakul, Giloy and Chlorhexidine Gluconate (CHX)	The antimicrobial activity were evaluated of neem, tulsi, bakul, giloy and CHX on Streptococcus mutans, Enterococcus faecalis and staphylococcus aureus.	Neem, tulsi, bakul, giloy and CHX possess good antimicrobial property.
27	Tavassoli-hojjati S *et al* [29]	2014	Pomegranate	Evaluated the capacity of Pomegranate juice as a storage medium for retaining avulsed teeth.	Pomegranate can be used as a suitable transport medium for avulsed tooth.
28	Rao D S *et al*[30]	2014	Neem, Acacia, Pongamia glabra, Achyranthes aspera, Streblus Asper.	Aqueous extracts of chewing sticks were evaluated against different kinds of plaque bacteria for their anti microbial property.	Chewing sticks had good inhibitory effect against plaque forming microorganisms.
29	Abbaszadegan A *et al* [31]	2015	Ferula Gummosa plant essential oil	Comparative study done of the Ferula Gummosa plant essential oil(FEGO) with sodium hypochlorite (NaOCl) and chlorhexidine (CHX) for the antimicrobial efficacy.	FGEO has a favorable antimicrobial effectiveness against endodontic Pathogens.

CORRESPONDING AUTHOR

Dr. Harsh Mahajan
Reader, Department of Maxillofacial Prosthodontics and Implantology,
Peoples Dental Academy,
Bhopal, Madhya Pradesh, India
Email: drharshmahajan2004@yahoo.com

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