



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

International Journal of Current Research
Vol. 11, Issue, 07, pp.5767-5771, July, 2019

DOI: <https://doi.org/10.24941/ijcr.35853.07.2019>

INTERNATIONAL JOURNAL
OF CURRENT RESEARCH

RESEARCH ARTICLE

ROLE OF HERBS IN ENDODONTICS

***Divya Jakhar, Sadhvi Gupta, Gursimran Singh Pabla, Fatinderjeet Singh,
Shivangi Duggal and Pratibha Marya**

Department of Conservative Dentistry and Endodontics, Genesis Institute of Dental Sciences and Research,
Ferozpur, Punjab, India

ARTICLE INFO

Article History:

Received 07th April, 2019
Received in revised form
15th May, 2019
Accepted 12th June, 2019
Published online 31st July, 2019

Key Words:

Herbal Medicine,
Herbal Extracts,
Dental Products.

*Corresponding author: Divya Jakhar

Copyright©2019, Divya Jakhar et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Divya Jakhar, Sadhvi Gupta, Gursimran Singh Pabla, Fatinderjeet Singh, Shivangi Duggal and Pratibha Marya, 2019. "Role of herbs in endodontics", *International Journal of Current Research*, 11, (07), 5767-5771.

ABSTRACT

Ayurvedic Medicine is a system of traditional medicine native to India and a form of alternative medicine. In Sanskrit, word Ayus, means "longevity", and Veda, means "related to knowledge or science". It is an ancient Indian science that mainly involves the use of naturally occurring herbs and shrubs to provide a cure for medical ailments without causing any undue side effects. With the recent boom in holistic and herbal medicine and an ever-growing trend among the general population towards herbal remedies as an alternative to traditional pharmaceutical therapies. These alternative products include some standard dental products made with natural ingredients, herbal products and homeopathic products. The use of herbal products should be based upon sound basic science and sufficient evidence of safety and efficacy. So this review article includes various Herbal Extracts and their effects and clinical implications in Endodontics.

INTRODUCTION

According to WHO, Herbal medicine is defined as plant derived material or preparation which contains raw or processed ingredients from one or more plants with therapeutic values. These drugs of plant origin are used to treat diseases and to attain or maintain a condition of improved health (Herbal Medicine). Recent trend in the usage of biologic medication extract from natural plants is seen because of the cytotoxic reactions, allergic potential, toxicity, unacceptable taste, etc. of the most of the commercial intracanal medicaments and irrigants used and their inability to eliminate bacteria from dentinal tubules (Malhotra et al., 2009). In dentistry, herbal medicine has been used as anti-inflammatory, antibiotic, analgesic, sedative agents, astringents, edema-reducing, soothing and healing accelerating agents (Badole et al., 2016). Dental caries still being among one of the most common diseases in the world, today herbal medicines are introduced into the toothpastes to prevent it (www.ijarse.com/images/fullpdf/1514290944_858ijarse.pdf). In endodontics, these herbs are used according to their effect as pain relievers and disinfection of root canal. Clove, pepper, turmeric, savory act by causing an analgesic effect on the nerve fibers. Triphala is an Indian ayurvedic herbal formulation consisting of dried and powdered fruits of three medicinal plants *Terminalia bellerica*, *Terminalia chebula*, and *Embllica officinalis*. It has a potential of antibacterial activity against enteric pathogens, and

also have anti-inflammatory activity. It is used as root canal irrigant in endodontics, as an anti caries agent in restorative treatment (Sardari et al., 2016). Garlic extract has a wide spectrum of antibacterial activity, against *Staphylococcus*, *Streptococcus*, *Klebsiella*, *Escherichia*, *Salmonella*, *Proteus*, *Clostridium*, *Mycobacterium* and *Helicobacter* species. Green Tea extract has an anti-bacterial activity against *Enterococcus faecalis* biofilms and various other bacteria causing root canal infections. Catechins, main component of Green tea are found to be inhibitory against *Streptococcus mutans* and proved to be a good root canal disinfectant (Sinha and Sinha, 2014). There are herbs which can also be used in retreatment cases where there is endodontic failure because of leakage and bacterial contamination or if tooth fails to heal or develops new problems. So, there should be a second chance to support healing and save the tooth by using these herbs in retreatment procedure. Orange oil, and rhus plant are the most common herbal extracts which can be used for root canal retreatment (Pan et al., 2014). So this article gives us a review about various Herbal Extracts and their effects and their clinical implications in Endodontics.

Classifications: According to Pan SY et al herbal medicine is broadly classified as (Kamat et al., 2014).

According to Kamat et al.

A) Phytotherapeutic substances are generally classified in to three groups.

1. Plant products
2. Animal products
3. Mineral origin

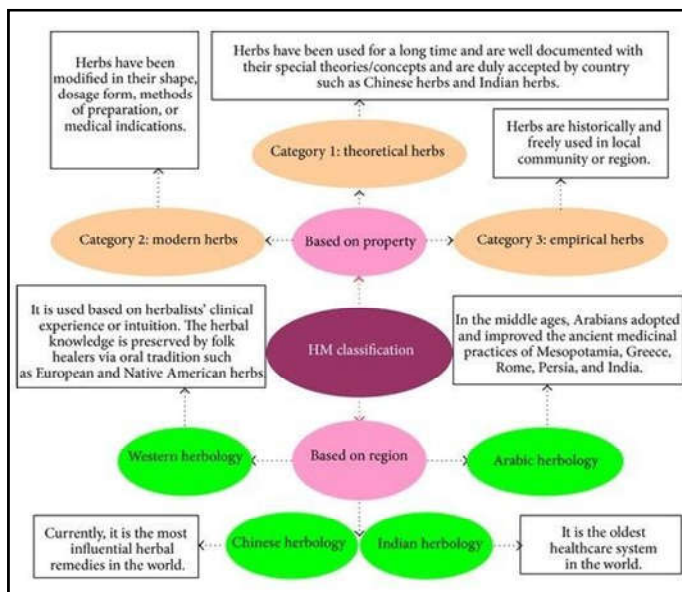


Fig. 1. Herbal Medicine Classification

Herbs used to alleviate dental pain

Herbal therapies used to alleviate pain are most commonly grounded in Western medicine approaches, Ayurvedic Medicine and Traditional Chinese Medicine (Antimicrobial, 2012): Herbal approaches usually have been pursued to alleviate pain because of the perception that many of these therapies are gentler and produce fewer side effects than pharmaceuticals (Bhowmik *et al.*, 2012). A number of herbal agents have established effects as pain relievers and anti-inflammatory drugs.

1. **Clove:** The dried flower buds of an East Indian evergreen tree, cloves are popularly used as a spice. Eugenol has pronounced anaesthetic property so when applied to a cavity in a decayed tooth, it also relieves toothache. Rubbing of oil of cloves on sore gums and teeth help to ease pain (Charantimath, 2011). Chewing of cloves diminishes bad breath ([http://en.wikipedia.org/wiki/Black pepper](http://en.wikipedia.org/wiki/Black_pepper)). Clove helps to decrease infection due to their antiseptic properties. Eugenol is added to root canal sealers (Endomethasone, Caryosan). It is used in the disinfection of the tooth canals in the treatment of pulp necrosis or as a precipitator while impregnating the dentin with silver nitrate ([www.BlackPepper/\(KALI MIRCH\). Html](http://www.BlackPepper/(KALI_MIRCH).Html)).
2. **Piper Nigrum:** Peppers have been in use since ancient times for its anti-inflammatory, carminative, anti-flatulent properties. They are also an excellent source of many vital B-complex groups of vitamins such as Pyridoxine, riboflavin, thiamin and niacin (<http://en.wikipedia.org/wiki/Turmeric>). A pinch of pepper powder mixed with clove oil can be put in the caries to alleviate toothache ([http://www.nutrition-and-you.com/black pepper.html](http://www.nutrition-and-you.com/black_pepper.html) Black pepper nutrition facts). Its daily use prevents dental caries, toothaches ([http://www.geocities.ws/ayurvedaadviser/ayurveda pepper.html](http://www.geocities.ws/ayurvedaadviser/ayurveda_pepper.html)).

3. **Curcuma longa:** Commonly called as Haldi/ Turmeric. It's useful part includes Rhizomes, always used in dried powdered form. Massaging the aching teeth with roasted, ground turmeric eliminates pain and swelling. Rinsing the mouth with turmeric water (boil 5g of turmeric powder, 2 cloves and 2 dried leaves of guava in 200g water) gives instant relief from pain (Nimbekar *et al.*, 2013). Applying the powder of burnt turmeric pieces and bishop's weed seed on teeth and cleaning them makes the gums and teeth strong (Nimbekar *et al.*, 2013). Applying the paste made from 1tsp turmeric and ½ tsp salt and ½ tsp of mustard oil provides relief from gingivitis and periodontitis. Rub the teeth and gums with this paste twice daily (<http://www.drugs.com/npp/savory.html>).

Herbs used for the disinfection of the root canal

The prime objective of root canal treatment is to clean the root canal system thoroughly, free of microbiota and debris, so that it can be sealed with a microbial-tight filling. This process mainly revolves around a process called "chemo mechanical preparation", wherein chemically active solutions are used along with mechanical instrumentation of the root canal space (<http://worlddrugtracker.blogspot.in/triphala-digestive-miracle.html>. 2014). In endodontics because of the cytotoxic reactions of the most of the commercial intracanal irrigants and medicaments used and their inability to eliminate bacteria from dentinal tubules, there has been a growing trend to seek natural remedies as part of dental treatment and this approach may be termed phytotherapeutics or ethnopharmacology (Prakash *et al.*, 2014). There are various herbs used in endodontics for the disinfection of the root canal. They can be either used as root canal irrigants or intracanal medicaments.

Herbs used as root canal Irrigants

Triphala: Triphala is an ayurvedic herbal rasyana formula consisting of equal parts of three myrobalans, Amalaki (*Embllica officinalis*), Bibhitaki (*Terminalia beellirica*) and Haritaki (*Terminalia Chebula*). Its Botanical name is Triphala (Properties of Garlic). Triphala Churna or Powder has many benefits and it includes protection and enhancement of the functions of the body organs such as the eyes, skin, and heart. Triphala has anti- bacterial activity against *Enterococcus faecalis* biofilms. *Terminalia chebula* is valuable in preventing plaque formation on the surface of the tooth. The anti-plaque effect is mainly due to the tannic acid in Triphala, which is adsorbed well to the groups on the surface of the bacterial cells, which result in protein denaturation and ultimately to bacterial cell death (Babu *et al.*, 2013). Triphala does not produce any side-effects as produced by the tetracycline compounds as well as other synthetic drugs in treating periodontal disease (Babu *et al.*, 2013).

Garlic: Garlic is an herb of the *Allium* or lily family, which also includes onions and leeks. It is also called "the stinking rose". Garlic is rich in a variety of powerful sulfur- containing compounds luding *thiosulfinates* (of which the best known compound is *allicin*), *sulfoxides* (among which the best known compound is *alliin*), and *dithiins* (in which the most researched compound is ajoene). These compounds are also responsible for garlic's characteristically pungent odor (www.gtisanes.com/Content/editor/ingredients.pdf). Its botanical name is *Allium sativum*. Its common name is Clove Garlic, Poor Man's

Treacle, Stinking rose, poor man's treacle and heal-all. Garlic extract is sensitive to *P. gingivais*, *P. Intermedia*, *A. actinomycetemcomitans*, *F. nucleatum* and *E. faecalis* and other bacteria responsible for root canal infections (<http://www.3fatchicks.com/the-difference-between-green-tea-and-green-teaextract>). Garlic helps to relieve toothaches due to its antibacterial and analgesic properties. It is an effective therapeutic to control the pain, promote ulcer healing in the oral cavity due to its anti-inflammatory action. The major component of garlic- Allicin, decreases inflammatory factors secretion, reduce the migration of neutrophils, inhibit bacterium and viruses, antagonize oxidation and regulate immunity (<http://www.3fatchicks.com/the-difference-between-green-tea-and-green-teaextract>).

Green tea extract: A green tea extract is a herbal derivative from green tea leaves (*Camellia sinensis*). Containing antioxidant ingredients – mainly Green tea catechins (GTC) (Venkateswara *et al.*, 2011).

How does it work?

The useful parts of green tea are the leaf bud, leaf, and stem. Green tea is not fermented and is produced by steaming fresh leaves at high temperatures. During this process, it is able to maintain important molecules called polyphenols, which seem to be responsible for many of the benefits of green tea.

What makes green tea so special? (Venkateswara *et al.*, 2011)

As a Root Canal Irrigant and Anticariogenic: Green Tea Extract has an anti-bacterial activity against *Enterococcus faecalis* biofilms and various other bacteria causing root canal infections. Catechins, main component of Green tea are found to be inhibitory against *Streptococcus mutans* and *Streptococcus sobrin* at minimum inhibitory concentration (MIC) ranging between 50–1000 µg/ml. Mouth rinsing with green tea extract protects teeth from erosion and abrasion. Green Tea significantly reduces the salivary levels of the virulent cariogenic pathogens like *Streptococcus mutans* and *Lactobacilli* and decreases the susceptibility to dental caries. Green Tea reduces the release of Maltose which causes mineral depletion from tooth enamel. Tea polyphenols significantly block the adhesion of oral bacteria in glycoprotein layer. Therefore, green tea consumption lessens the cariogenic potential of starch containing foods like crackers and cakes. The bactericidal activity against *S. mutans* is conspicuous in Japanese green tea extracts, and the maltose level in mouth is consistently lower after drinking tea. Therefore, green tea extracts is effective in oral hygiene maintenance. Green tea extracts can enhance the effect of penicillin G against *B. Subtilis*. There is synergy of green tea and penicillin G against *Bacillus subtilis* (Kaushik *et al.*, 2012).

NEEM: The Neem tree (*Azadirachta indica A. Juss.*) has been known as the wonder tree for centuries in the Indian subcontinent. It has become important in the global context today because it offers answers to the major concerns facing mankind (Mahfuzul Hoque *et al.*, 2007).

Components of Neem and their Uses (Mahfuzul Hoque *et al.*, 2007)

Bark: The bark is cool, bitter, astringent, acrid and refrigerant. It is useful in tiredness, cough, fever, loss of appetite, worm

infestations. It heals wounds and is also used in vomiting, skin diseases and excessive thirst. Twigs have been used as a 'toothbrush' and for dental care, since antiquity. Neem toothpaste has been on sale in the US and Germany for some time, and is now available in India.

Leaves According to Ayurveda, Neem leaves help in the treatment of Vatik disorders (neuromuscular pains). Neem leaves are also reported to remove toxins, purify blood and prevent damage caused by free radicals in the body by neutralising them. A paste made with leaves is used in India for the cure of chicken pox, smallpox and warts. A poultice is effective for boils, ulcers and eczema.

Seeds Neem seeds are also described as anthelmintic, antileprotic (cures or prevents leprosy) and antipoisonous. Seeds, along with leaves and dry Neem cake, are an active ingredient in mosquito coils.

Oil Neem oil, derived from crushing the seeds, is antidermatonic, As oil used in aromatherapy, it has been effective in the treatment of head lice in children, especially where tea tree has failed to clear up the condition. It is used As a Potent Root Canal Irrigant (Sadhan *et al.*, 1999), Anti Caries Agent (Al-Bayaty *et al.*, 2010), In Chronic Gingivitis and Periodontal Diseases (Sadhan *et al.*, 1999), Oral Care (Sadhan *et al.*, 1999) and Anti-Carcinogenic (Sadhan *et al.*, 1999).

MISWAK: Miswak is a chewing stick prepared from the roots or twigs of *S. persica*. Sticks from these plants are usually chewed on one end until they become frayed into a brush like form, which is then used to clean the teeth in a similar manner to a toothbrush (Halawany, 2012). The conventional meaning of Miswak is 'stick used on teeth and gums to clean them. In addition to strengthening the gums, it prevents tooth decay, eliminating toothaches and halt further increase in decay that has already set in. It creates a fragrance in the mouth, eliminates bad odor, improves the sense of taste, and causes the teeth to glow and shine (Meena *et al.*, 1991). Its Botanical Name is *Salvadora Persica* and its common Name is Sewak (miswak). The Parts of Miswak used for therapeutic applications are Twigs from tree. The extract of *S. Persica* miswak can be used as a effective root canal irrigant as it has an inhibitory effect on the growth of *Candida albicans* due to its high sulfate content. *Enterococcus faecalis* is the most sensitive microorganism affected by the use of *S. persica* Miswak. It also has strong antimicrobial effects on the growth of *Streptococcus* sp. and *Staphylococcus aureus*. The alcoholic extract has more potent antimicrobial activity than the aqueous extract (<http://www.aae.org/patients/treatments-and-procedures/endodonticretreatment-explained.aspx>). *S. persica* miswak had strong anti-decay effects. The aqueous extracts of miswak significantly inhibit the growth of cariogenic bacteria. It is due to the large amounts of fluoride present in Miswak.

Intracanal Medicaments

ALOE VERA: The Aloe vera plant has been known and used for centuries for its health, beauty, medicinal and skin care properties. The name Aloe vera derives from the Arabic word "Alloeh" meaning "shining bitter substance," while "vera" in Latin means "true." 2000 years ago, the Greek scientists regarded Aloe vera as the universal panacea. The Egyptians called Aloe "the plant of immortality" (http://en.wikipedia.org/wiki/Orange_oil). *Rhus typhina* From Wikipedia, the free

encyclopedia.). The botanical name of Aloe vera is *Aloe barbadensis miller*. It belongs to Asphodelaceae (Liliaceae) family, and is a shrubby or arborescent, perennial, xerophytic, succulent, pea- green color plant. It grows mainly in the dry regions of Africa, Asia, Europe and America. In India, it is found in Rajasthan, Andhra Pradesh, Gujarat, Maharashtra and Tamil Nadu. Aloe vera has antimicrobial effect against resistant microorganisms found in pulp space i.e. *Candida albicans* and *Enterococcus faecalis*. Water, chloroform and alcohol extracts of aloe vera derived from pulp are found to have Antibacterial efficacy and can be used as an intracanal medicament. It can be used in root canals as sedative dressing and as file lubricant. The nerve ends in a root canal are very sensitive. Aloe Vera greatly helps to lessen its sensitivity. This gel can be placed inside the pulp chambers while broaching to make allow work in the pulp canals. Aloe can also be used as canal lubricant. During closed dressings cotton pellet with CMCP drops could be added with a drop of aloe vera gel and then sealed with temporary restorations (<http://www.kingtooth.com>. Homeopathy and dentistry).

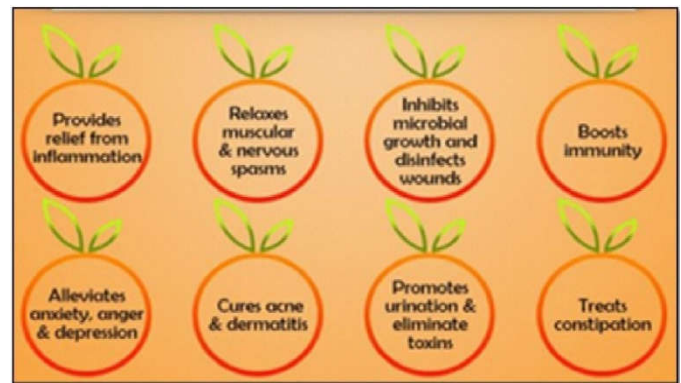
Herbs used for retreatment

Endodontic failures can be attributable to inadequacies in shaping, cleaning and obturation, iatrogenic events, or re-infection of the root canal system when the coronal seal is lost after completion of root canal treatment. Regardless of the etiology, the sum of all causes is leakage and bacterial contamination. With proper care, even teeth that have had root canal treatment can last a lifetime. But sometimes, a tooth that has been treated doesn't heal properly and can become painful or diseased months or even years after treatment. If tooth failed to heal or develops new problems, we should have a second chance to support healing and save the tooth. An additional procedure can be done which is known as Retreatment ([http://ezinearticles.com/Herbal-and-Natural-Remedies-for-Common-Toothand-Gum Ailments](http://ezinearticles.com/Herbal-and-Natural-Remedies-for-Common-Toothand-Gum-Ailments)). The goals of nonsurgical retreatment are to remove materials from the root canal space and if present, address deficiencies or repair defects that are pathologic or iatrogenic in origin. Retreatment procedures confirm mechanical failures, previously missed canals or radicular subcrestal fractures. Importantly, disassembly and corrective procedures allow clinicians to shape canals and three-dimensionally clean and pack root canal systems. Nonsurgical endodontic retreatment procedures have enormous potential for success if the guidelines for case selection are respected and the most relevant technologies, best materials and precise techniques are utilized. Before commencing with treatment, it is profoundly important to consider all interdisciplinary treatment options in terms of time, cost, prognosis and potential for patient satisfaction. Endodontic failures must be evaluated so a decision can be made among nonsurgical retreatment, surgical retreatment, or extraction.

There are some herbs which can be used in retreatment procedures and they are discussed further-

1. **Orange oil:** Orange oil is an essential oil produced by cells within the rind of an orange fruit (*Citrus sinensis* fruit). In contrast to most essential oils, it is extracted as a by-product of orange juice production by centrifugation. Orange oil is extracted from the small glands found on the orange peel. Orange oil helps in the disintegration of zinc oxide Eugenol sealer. Orange oil softened gutta-percha cones in Endodontic Retreatment

with results similar to xylol and can be used as an alternative solvent.



Benefits of orange oil

2. **Rhus plant:** *Rhus typhina* is a species of flowering plant in the family Anacardiaceae, native to eastern North America. It is primarily found in Southeastern Canada, the Northeastern and Midwestern United States and the Appalachian Mountains, but is widely cultivated as an ornamental throughout the temperate world. Its botanical name is *Rhus typhina* and its common name is staghorn sumac or stag's horn sumach. Rhus plant has astringent action i.e it has a 'binding' action on tissue. It is usually due to a group of complex chemicals called tannins. The tannins have the property of precipitating, or curdling, protein molecules. As saliva and tooth contents contain proteins that are in solution, Rhus Plant containing tannins cause them to become insoluble and precipitate and help in the opening of dentinal tubules. Water extract of Rhus plants also help in opening of blocked dentinal tubules which help in retreatment of endodontic procedures. Rhus Typhina has the most antimicrobial action among all the species. Its antimicrobial effect is attributed to its content of gallic acid, 4-methoxygallic acid, and methyl gallate. Tannins exhibit antibacterial and antifungal properties. Gallic acid is antioxidant and bactericidal. Alcoholic extracts had the strongest activity. Gallic acid present in Rhus plant has been found to reduce periapical inflammation

Home remedies for common oral pathosis

Healing After Dental Procedures: After a tooth extraction, gum surgery, or other dental procedures, annato-seed pulp can be applied to the area to enhance healing. The fresh tops of St. John's wort (also known as shepherd's purse) help stop any bleeding. A chamomile poultice reduces pain and swelling. Elderberry mouthwash following gum surgery or suture placement helps the gums to heal properly, preventing scars. Antibiotic red clover ointment or marigold or yarrow mouthwash also enhances the healing process.

Toothaches: Applying a powder of blackened eggplant and salt directly to the tooth will lessen a toothache. Rinsing the mouth with hydrogen peroxide, chewing a clove bud, or even applying just plain salt to the tooth will also help. Saturating a cotton ball in an essential oil such as Newbouldia laevis, cayenne, clove, peppermint, summer savory, wintergreen, or tincture of hops, and placing it directly on the tooth will also ease toothaches in an emergency. Since a persistent toothache

often signals a more severe condition, it is wise to visit the dentist when this symptom occurs.

Infections and Abscesses in the Mouth: Garlic, a natural antibiotic for bacterial and fungal infections, and immune system strengthener, helps heal mouth infections. Fresh oil of garlic or raw cloves is the most effective form. Odorless garlic extracts are also available in health-food stores. A mouthwash of the horsetail herb or witch hazel also treats infections of the mouth and gums. The common weed dandelion, a blood purifier, as well as Echinacea combined with myrrh and licorice root, and ointment of red clover leaves and flowers, is good treatments for mouth abscesses. A salve or ointment of sanicle, a powerfully antioxidant herb, can also heal septic wounds. In the event of an infection or abscess in the mouth, it is best to combine any at-home treatment with a trip to the dentist.

Conclusion

The focus of the current studies should be more in investigating unexplored herbal drugs and other natural products, as well as their therapeutic application, side effects and possible drug interactions as there are only few studies to support their rational use in dentistry. Since there is an increasing use of phytotherapeutic agents in dentistry, further studies are needed to evaluate their safety and effectiveness for clinical use. In conclusion, Herbal Dentistry has a vast scope in the dental field. Some dedicated research should be directed in this area so that in the course of years, it may become a common practice in the dental field.

REFERENCES

- Al-Bayaty FH, Al-Koubaisi AH, Wahid Ali NA, Abdulla MA. 2010. Effect of mouth wash extracted from *Salvadora persica* (Miswak) on dental plaque formation: A clinical trial. *J Med Plt Res.*, 4(14):1446-54.
- Antimicrobial, antioxidant, anticancer activities of *Syzygium caryophyllatum* (L.) Alston in 2012.
- Azimi S, Rafeian N, Zanjani HA. 2009. Herbs in dentistry. *IDJ*, 1-11.
- Babu S, Ajila V, Hegde S. 2013. GARLIC: It's Role In Oral And Systemic Health. *Nit Uni J Hlth.*, 3: 110-25.
- Badole GP, Bahadure RN and Kubde R. 2016. Herbal Medicines in Endodontics: An Overview. *J Dent and Oral Disord.*, 2(9): 1046.
- Bhowmik D, Kumar KPS, Yadav A, Srivastava S, Paswan S, Sank A. 2012. Recent Trends in Indian Traditional Herbs *Syzygium aromaticum* and its Health Benefits. *J Pharm Phyto.*, 1: 13-22.
- Charantimath S, Oswal R. 2011. *Innov J Med H Sci.*, 1: 1-4.
- Clove % 20 Bulb % 20 (Syzygium % 20 Aromaticum).html.
- Cloves (*Syzygium aromaticum* [L.] Merr.Perry)Synonyms./ com.
- Halawany HS. 2012. A review on miswak (*Salvadora persica*) and its effect on various aspects of oral health. *Saudi Dent J.*, 24(2): 63-9.
- Herbal Medicine. Available at: www.infoherb.com/Herbal_medicine.html.
- Herbal Therapy In Dentistry. The Complete Book of Dental Remedies, Avery Publishing Group, 1996.
- Kamat S, Kumar R, Saraf P. 2011. Review Article Role of herbs in endodontics: An Update. *Int Endod J.*, 98-102. Intergrativ Pain Medicine, Pain Management, 29th March 2014.
- Kaushik A, Tanwar R, Kaushik M. 2012. Ethnomedicine. Applications of *Neem Azadirachta indica*) in dentistry. *Ind J Dent Res.*, 3: 112-4.
- Mahfuzul Hoque MD, Bari ML, Inatsu Y, Juneja VK, Kawamoto S. 2007. The effect of mango and neem extract on four organisms causing dental caries: *Streptococcus Mutans*, *Streptococcus salivarius*, *Streptococcus mitis*, *Streptococcus sanguis*: An in vitro study. *Indian J Dent Res.*, 2: 1-9.
- Malhotra R, Grover V, Saxena D. 2011. Comparison of the effectiveness of a commercially available herbal mouthrinse with chlorhexidine gluconate at the clinical and patient level. *J Indian Soc Periodontol.*, 15(4): 349-52.
- Meena M, Figueiredo NR, Trivedi K. Aloe vera – An Update for Dentistry. *J dent facial Sci.*, 2(3):
- Nimbekar T, Wanjari B, Bais Y. 2013. Ethnobotanical Approach against Resistant Endodontic Pathogens using herbs: A Review. *Int J Endod.*, 4(4): 3661-6.
- Pan, Litscher SY, Gao G, Zhou SH, Yu S, Chen ZL, Zhang HQ, Tang SF, Sun MK, Ko JN, Ming K. 2014. Historical Perspective of Traditional Indigenous Medical Practices: The Current Renaissance and Conservation of Herbal Resources. *Evid based complement alter med.*
- Prakash S, Shelke AU. 2014. Role of Triphala in dentistry. *Ind J Dent Res.*, 18(2): 132-5.
- Properties of Garlic, Available at: http://www.botanicaline.com/medicinal_alliumsativumangles.htm.
- Sadhan RI, Almas K. 1999. Miswak (chewing Stick): A Cultural and Scientific Heritage. *Saudi Dent J.*, 11(2): 80-8. sanskritdocuments.org/articles/TheNeemtree.doc.
- Sardari, Farimah, Hajisadeghi, Samira, 2016. Comparison of the Antimicrobial Efficacy of Green Tea Extract With 1% Sodium Hypochlorite Against *Enterococcus faecalis*: An In Vitro Study Jundishapur. *J Nat Pharm Prod.*, 1-6.
- Shelton RM. 1991. Aloe Vera- Its Chemical and Therapeutic Properties. *Int J Derm.*, 3: 679-783.
- Sinha DJ, Sinha AA. 2014. Natural Medicaments in Dentistry. *Ayu.*, 35(2): 113- 8.
- Venkateswaea B, Sirisha K, Chava VK. 2011. Studies on effects of green tea on periodontal health. *J Indian Soc Periontal.*, 15(1):18-22
- Venkateswara B, Sirisha K, Chava VK. 2011. Studies on effects of green tea on periodontal health. *J Indian Soc Periodontol.*, 15(1): 18-22.
- <http://en.wikipedia.org/wiki/Turmeric>.
- http://en.wikipedia.org/wiki/Black_pepper.
- http://en.wikipedia.org/wiki/Orange_oil. Rhus typhina From Wikipedia, the free encyclopedia.
- <http://ezinearticles.com/Herbal-and-Natural-Remedies-for-Common-Toothand-Gum-Ailments>.
- <http://worlddrugtracker.blogspot.in/triphala-digestive-miracle.html>. 2014.
- <http://www.3fatchicks.com/the-difference-between-green-tea-and-green-teaextract>.
- <http://www.aae.org/patients/treatments-and-procedures/endodonticretreatment-explained.aspx>.
- <http://www.drugs.com/npp/savory.html>.
- <http://www.earningaboutes.com/index.php/2013/11/10/peppermint-essentialoilprofile-cautions-dilution-guidelines-therapeutic-properties-scientific-research>.
- http://www.kingtooth.com.Homeopathy_and_dentistry.
- http://www.nutrition-and-you.com/black_pepper.html Black pepper nutrition facts.
- <http://www.webmd.com/vitamins-supplements/ingredientmono-960-GREEN%20TEA.aspx?activeIngredientId=960&activeIngredientGREENTEA>
- http://www.geocities.ws/ayurvedaadviser/ayurveda_pepper.html.
- [www.Black Pepper/\(KALI MIRCH\).html](http://www.BlackPepper/(KALI_MIRCH).html).
- www.gtisanes.com/Content/editor/ingredients.pdf.
- www.ijarse.com/images/fullpdf/1514290944_858ijarse.pdf
- www.myamazingfact.blogspot.com/. The Amazing Health Benefits of Cloves.