A review on uses of clove in oral and general health

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ABSTRACT

Today, herbal medicine is becoming more and more popular as a safe and effective means of treatment for many different medical conditions. Herbs are often preferred because they are natural and do not put harmful chemicals into the body. Herbs are available fresh, as capsules, powders, extracts, roots, etc.
Some people prefer to grow their own. Always seek advice from an expert before taking herbs as a supplement or as a health remedy. Traditional healers have long used botanicals to prevent or cure infectious diseases (Dhinahar S 2011). Cloves are the aromatic dried flower buds of a tree in the family Myrtaceae, Syzygium aromaticum. Cloves are native to the Maluku islands in Indonesia and used as a spice in cuisines all over the world. Cloves are harvested primarily in Indonesia, India, Madagascar, Zanzibar, Pakistan and Sri Lanka.

Key words: clove, oral, health, dentistry

INTRODUCTION

Cloves vary in length from about 1/2 to 3/4 inch and contain 14-20% essential oil. Cloves are strongly pungent due to their high content of eugenol, which can be extracted by distillation to yield the essential oil. Clove buds have been regarded as safe when taken orally for medicinal use. Cloves have been used by humans for medicinal applications for over two thousand years (Rahim AHZ 2006).

Indigenous to the Moluccas spice islands of Indonesia, cloves also grow naturally in India, the West Indies, Tanzania, Sri Lanka, Brazil and Madagascar. With their sultry sweet aromatic flavor and powerful essential oil compounds, cloves have been used for hundreds of years as a nutritional spice for food and a remedy for a variety of health concerns. For over 2,000 years, both Indian and Chinese traditional medicine made extensive use of clove flowers and clove oil(Bhowmik D 2012).

It is an ever-green plant of 10 to 20 m in height with spear-shaped leaves and racemiferous yellowish flowers, has a strong phenolic smell and sharp acrid taste, whereas, essential oil of clove is a colorless or light yellowish fluid extracted from dried flower buds(Yadav R 2013).

Clove was first introduced to India around 1800 AD by the East India company in its 'spice garden' in Courtallam, Tamil Nadu. Induced by the success of its introduction, cultivation of clove was extended during the period after 1850 AD to Nilgiris (Burliar), southern region of the erstwhile Travancore State and the slopes of Western Ghats. The important clove growing districts in India now are Nilgiris, Tirunelveli, Kanyakumari, Nagercoil and Ramanathapuram districts of Tamil Nadu; Kozhikode, Kottayam, Kollam and Thiruvananthapuram districts of Kerala and South Kanara district of Karnataka.

A drop of clove oil is 400 times more powerful as an anti-oxidant than wolf berries or blueberries. Health benefits from the use of clove have been known over the centuries. It is beneficial as a home remedy in curing several ailments / diseases. In addition to its culinary uses, the clove buds have an abundance of medicinal and recreational uses (Milind P 2011).

Therapeutic uses of clove/clove oil:

1. Syzygium aromaticum Clove oil (Laung) is applied for toothache, dental caries and pyorrhea (Yadav R 2013, Oral Health: Queensland Positive People 2013).

2. Popular remedy for headache, sore throat, dental and respiratory disorders, digestive system ailments, in traditional medicines of Australia and Asian countries (Yadav R, 2013).
3. Hot water extract of clove plant inhibits the growth of S. mutans (Uju DE 2011).
4. The clove oil shows antimicrobial activity against *Actinobacillus actinomycetemcomitans, Capnocytophaga gingivalis, Fusobacterium nucleatum, Porphyromonas gingivalis, Prevotella intermedia, Prevotella melaninogenica, Staphylococcus aureus, Pseudomonas aeruginosa, Candida albicans, Escherichia coli*. The antimicrobial action observed for the clove oil suggests its usage as an adjuvant to periodontal therapy. Oral intake of clove suppresses the over growth of C. albicans in the alimentary tract including the oral cavity(Ali H.S, 2011; Yuuki T, 2005; Shehata SME, 2011; Rana SI, 2011; Hema R, 2010; Nassar IM, 2007).
5. Clove oil in the form of clove paste in Aphthous Ulcer treatment acts as a biocide being active against invasive bacteria, fungi and even invading larvae (Rana SI, 2011; Holloway CA, 2004).
6. Eugenia has properties like anti-inflammatory, analgesic, antipyretic, antifungal and used in peptic ulcer treatment. Significant anti-inflammatory activity is found to be at 0.025 mL/kg(Yadav R, 2013; Nassar IM, 2007; Nassar IA, 2007).
7. At low concentration acts as an antioxidant and anti-inflammatory agent, whereas its higher concentrations act as a pro-oxidant resulting from the enhanced generation of tissue-damaging free radicals Antioxidants are believed to neutralize the free radicals in lipid chains by contributing a hydrogen atom usually from a phenolic hydroxyl group, which in turn converts phenolic groups into stable free radicals that do not intiate or propagate further oxidation of lipids (Yadav R, 2013; Nassar IM, 2007; Ashok DB, 2006; Singh J, 2012; Nassar IA, 2007).
8. Clove oil helps in the reduction of amount of plaque deposition on oral hard tissues (Sikka G, 2011).
9. Clove extracts helps reduce root canal microflora (Shehata SME, 2011; KUMAR NMD, 2011).
10. Clove has shown antibacterial activity against S. mutans and Enterococcus faecalis (Khan R, 2009).
11. Respiratory Problems: Clove oil has a cooling and anti inflammatory effect, and thereby clears the nasal passage. This expectorant is useful in various respiratory disorders including coughs, colds, bronchitis, asthma, sinusitis, and tuberculosis. Chewing a clove bud eases sore throats (Singh J, 2012).
12. Ear ache: A mixture of warm clove oil and sesame oil is a good remedy for ear aches(Singh J, 2012).
13. Combination (as in *Yaji*) has no adverse effects but showed possible beneficial attributes for consumers (Eruke SO, 2013).
14. The hydro-alcoholic extract of clove possesses significant anti-stress activity. The high dose of clove extract prevents the development of gastric ulcers in cold restraint stress induced gastric ulcer and decreases the levels of biochemical markers of cell damage (Singh KA,2009).
15. The aqueous extract of clove causes inhibition of inflammation. The extract can inhibit both acute and chronic inflammation and modulates a cascade of biochemical reactions that propagate and mature the inflammatory response. There is inhibition in the formation of edema and granuloma and the extract is found to decrease elevated levels of several biochemical parameters involved in inflammation and oxidative stress (Singh KA, 2009).
16. Eugenol (l-hydroxy-2-methoxy-4-allylbenzene), a natural compound available in honey and various plants extracts including clove is exploited for various medicinal applications (Timsina B, 2012).
17. Clove oil (eugenol) is a suitable anaesthetic for aquacultural and sheries use, although it is

important to note that it has not been approved for such applications in most countries at the present time. This is due primarily to the lack of animal and human safety testing necessary to support applications for regulatory approval(Hema R, 2010; Holloway CA, 2004; Nga T, 2011).

18. Clove oil has been demonstrated to be an effective, inexpensive anaesthetic and euthanizing agent for a number of fish species, including rainbow trout, used in aquaculture and fisheries research (Holloway CA, 2004; Nga T, 2011).
19. Acute administration of an ethanolic extract of clove enhances the learning and memory recall processes in mice which support the anti-oxidative action of its eugenol component (Dashti-R HM, 2009).
20. The ethanol extract of clove showed remarkable hepatoprotective activity against paracetamol-induced liver injury in female rats. A possible mechanism for protection by clove against paracetamol-induced liver damage could involve clove components acting as free radical scavengers intercepting those radicals involved in paracetamol metabolism by microsomal enzymes (Nassar IM, 2007).
21. Eugenol was found to reduce fever in rabbits when given intravenously in low doses Eugenol was more effective in reducing fever than acetaminophen (Nga T 2011).
22. Cloves are used as a carminative, to increase hydrochloric acid in the stomach and to improve peristalsis. Cloves are also said to be a natural anthelmintic (Hema R, 2010).
23. Tellimagrandin II is a ellagi tannin found in S. aromaticum with anti-herpesvirus properties (Hema R, 2010).
24. Clove oil induces 100 percent mortality in mosquitoes like *Anopheles stephensi, Aedes aegypti, and Culex quinquefasciatus* at a dose of 7 L/ha in 30-35 minutes (Nga T, 2011).

CONCLUSION

Clove is a medicinally important drug, reported to have a variety of different applications like antioxidant, antifungal, antiviral, antibacterial, antiinflammatory, antithrombic, antipyretic, analgesic, anticonvulsant, antimycotic, insecticidal, antimutagenic, antiulcerogenic etc. The oil is used for treating a variety of health disorders including toothaches, indigestion, cough, asthma, headache, and stress and blood problems. Clove is used to treat various health conditions, including intestinal parasites, migraine headaches, colds, impotence, and gastrointestinal problems such as nausea, vomiting, diarrhea and gas. There is a great scope for researchers to develop efficacious formulations using clove.

REFERENCES

Ahmad T, Shinkafi ST , Routray I, Mahmood A, Ali S. Aqueous Extract of Dried Flower Buds of Syzygium aromaticum Inhibits Infl ammation and Oxidative Stress; Journal of Basic and Clinical Pharmacy, 3(3), 2012, 323-327.

Ali, H.S, Kamal M, Mohamed S B, In vitro clove oil activity against periodontopathic bacteria. J.Sc. Tech, 10(1), 2011, 1-7.

Ashok DB, Devasagayam TPA. Currrent status of herbal drugs in india:an overview, J clin biochem.nutr, 42, 2006, 1-11.

Bhowmik D, Kumar KPS, Yadav A, Srivastava S, Paswan S, Dutta AS, Recent Trends In Indian Traditional Herbs Syzygium Aromaticum And Its Health Benefits. Journal Of Pharmacognosy And Phytochemistry, 1(1), 2012, 13-23.

Dashti-R HM, Morshedi A. The effects of *Syzygium aromaticum* (clove) on learning and memory in mice. Asian Journal of Traditional Medicines, 4 (4), 2009, 128-133.

Dhinahar S , Lakshmi T, Role of Botanicals As Antimicrobial Agents In Management Of Dental Infections – A Review, International Journal of Pharma and Bio Sciences, 2, 2011, 690-04.

Eruke SO, Okechukwu MM , Bassey EE. Effects of consumption of yaji (clove, ginger, garlic and red pepper) on some haematological parameters of wistar albino rats. Research Journal in Engineering and Applied Sciences, 2(2), 2013, 120-125.

Hema R., Kumaravel S, Sivasubramanian C..GC-MS Study On The Potentials Of Syzygium aromaticum; Researcher, 2(12), 2010, 1-4.

Holloway CA, Keene LJ, Noakes GD , Moccia DR. Effects of clove oil and MS-222 on blood hormone profiles in rainbow trout *Oncorhynchus mykiss*, Walbaum .aquaculture Research 2004; 35(11): 1025-1030.

Holloway CA, Keene LJ, Noakes GD , Moccia DR. Effects of clove oil and MS-222 on blood hormone profiles in rainbow trout Oncorhynchus mykiss, Walbaum; Aquaculture Research, 35(11), 2004, 1025-1030.

Ic GI¸ Elmastas M, Aboul-Enein YH; Antioxidant activity of clove oil – A powerful antioxidant source; Arabian Journal of Chemistry, 5, 2012, 489–499.

Khan R, Islam B, Akram M, Shakil S , Ahmad A, Ali MS , Siddiqui M, Khan UA. Antimicrobial Activity of Five Herbal Extracts Against Multi Drug Resistant (MDR) Strains of Bacteria and Fungus of Clinical Origin; Molecules, 14, 2009, 586-597.

KUMAR NMD, SIDHU P; The antimicrobial activity of azardirachta indica, glycyrrhiza glabra, cinnamum zeylanicum, syzygium aromaticum, accacia nilotica on streptococcus mutans and enterococcus faecalis - An in vitro study; endodontology, 23 (1), 2011, 16-23.

Milind P, Khanna D .Clove: A Champion Spice, IJRAP, 2 (1), 2011, 47-54.

Nassar IA , Gaara HA, El-Ghorab HA, Farrag HRA, Shen H, Huq E , Mabry JT. Chemical Constituents of Clove (Syzygium aromaticum, Fam. Myrtaceae) and their Antioxidant Activity, Rev. Latinoamer. Quím, 35(3), 2007, 47-57.

Nassar IM, Gaara HA, El-Ghorab HA, Farrag HRA, Shen H, Huq E , Mabry JT. Chemical Constituents of Clove (Syzygium aromaticum, Fam. Myrtaceae) and their Antioxidant Activity Rev. Latinoamer. Quím, 35(3), 2007, 35-38

Nwaopara OA, Odike CAM, Inegbenebor U, Nwaopara OS , Ewere IG .A Comparative Study on the Effects of Excessive Consumption of Ginger, Clove, Red Pepper and Black Pepper on the Histology of the Kidney, Pakistan Journal of Nutrition, 7(2), 2008, 287-291.

Rahim AHZ, Khan GSBH, Comparative studies on the effect of crude aqueous (ca) and solvent (cm) extracts of clove on the cariogenic properties of streptococcus mutans, Journal of oral science, 48 (3), 2006, 117-123.

Rana SI, Rana SA, Rajak CR; Evaluation of antifungal activity in essential oil of the syzygium aromaticum By extraction, purification and analysis of its main component eugenol; Brazilian Journal of Microbiology, 42, 2011, 1269-1277.

Shehata SME, El-Din MM, Abo-Donia SA, Mettwally M, Attia ZA, Toxicological Affects Of Essential Oils From Eucalyptus Eucalyptusglobules And Clove Eugenia carophyllus on albino rats. Polis J of envirnmen.stud, 20(2), 2011, 429-434.

Sikka G, Dodwad V, Chandrashekar KT. Comparative Anti-plaque and Anti-gingivitis Efficacy of Two Commercially Available Mouthwashes - 4 Weeks Clinical Study. J Oral Health Comm Dent, 5(3), 2011, 110-112.

Singh J, Baghotia A, Goel SP. Eugenia caryophyllata Thunberg (Family Myrtaceae): A Review; International Journal of Research in Pharmaceutical and Biomedical sciences 2012;3 (4):1469-1475.

Singh KA, Dhamanigi SS, Asad M, Anti-stress activity of hydro-alcoholic extract of Eugenia caryophyllus buds (clove); Indian J Pharmacol, 41(1), 2009, 28-31.

Thosar N, Basak S, Bahadure NR, Rajurkar M. Antimicrobial efficacy of five essential oils against oral pathogens: An in vitro study. European Journal of Dentistry, 7 (1), 2013, 71-77.

Timsina B, Shukla M, Nadumane KV. A review of few essential oils and their anticancer property; Journal of Natural Pharmaceuticals, 3(1), 2012, 1-8.

Uju DE, Obioma NP. Anticariogenic potentials of clove, tobacco and bitter kola. Asian Pacific Journal of Tropical Medicine, (4), 2011, 814-818.

Yadav R , Yadav SK, Dental disease and its cure-a review, Asian J Pharm Clin Res, 6(2), 2013, 16-20.

Yuuki T, Hiroko I, Toshio T, Shigeharu I, Hideyo Y, Shigeru A. Protection of oral or intestinal candidiasis in mice by oral or intragastric administration of herbal food, clove (syzygium aromaticum), Jpn.J.Med.Mycol, (46), 2005, 27-33.