ORIGINAL RESEARCH PAPER

Volume-7 | Issue-11 | November-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

BENEFITS OF LICORICE ROOT IN ORODENTAL DISEASES: A REVIEW

Dental Science

Dr. Malvania Ekta A* M.D.S., Public Health Dentistry, Senior Lecturer, Department Of Public Health Dentistry, AMC Dental College and Hospital *Corresponding Author

Dr. Sheth Sona A M.D.S., Periodontia, Head Of Department/reader, Department Of Public Health Dentistry, AMC Dental College and Hospital

Dr. Sharma Ashish S B.D.S., PGDPHM, Lecturer, Department of Public Health Dentistry, AMC Dental College and Hospital

Bhadiyadra Khyati D Intern, Department of Public Health Dentistry, AMC Dental College and hospital

ABSTRACT

INTRODUCTION: Herbal medicine is increasingly common form of alternative therapy throughout the world due to emergence of multidrug resistant bacteria. Licorice(Glycyrrhiza Glabra) commonly known as Yashtimadhu, is one such herb which has medicinal value and was used as a remedy for various ailments from antiquity. Licorice has shown remarkable activity against a large number of organisms, such as bacteria, fungi, viruses, parasites etc. In dentistry, phytomedicines has been commonly used as an anti inflammatory, antibiotic, analgesic and as a sedative agent.

OBJECTIVES: This paper aims at providing comprehensive review on the effects of licorice on common oro dental diseases by reviewing the available data as evidenced in these topics.

METHODS: Published literature in English were identified through pubmed, google scholar and World Health Organization website using MeSH terms licorice, dentistry, oral diseases. Out of 210 abstracts only 23 articles were included in this review after applying inclusion and exclusion criteria.

RESULTS AND CONCLUSION: Due to anti inflammatory, cariostatic, antibacterial, antiplaque, antiviral, antimycotic, ulcer healing, antitumor properties, licorice can prove to be beneficial to treat various oral diseases.

KEYWORDS

licorice root, oral diseases, dentistry

INTRODUCTION

Over the past years, interest in drugs delivered from medicine plants has markedly increased, because of the adverse effects and resistance occuring in conventional pharma products. In 2003, according to WHO, use of traditional herbal medicines has spread to both developing and developed countries as a compliment way to treat and prevent illness.[1]

The World Health Organisation (WHO) estimated that about 80% population of developing countries relies on traditional medicines for their primary health care needs.[2]Particularly in rural India, uses of raw plant products as well as some concoction of ayurvedic medicines are commonly used, because of easy availability.[2,3]

In dentistry, phytomedicines has been used as an anti-inflammatory, antibiotic, analgesic, sedative and also as endodontic irrigant.[1,4]

"Let Food be Thy Medicine and Medicine be Thy Food" said Hippocrates, Father of Medicine, a millennium ago. It's still true today that 'you are what you eat'.[5]

Licorice commonly known as Yashthimadhu in Ayurveda is one such plant. Licorice (Glycyrrhiza glabra) symbolises all that is wondrous in nature because, the it is used as traditional medicine for household remedy against various human ailments from antiquity.[2] Licorice is a very well known herb in Chinese medicine.[6] In China, it is called "gancao" means sweet grass and has been recorded in the Shennong's classic of Materia Medica around 2100 BC. which says that licorice was supposed to have life-enhancing properties.[1,6,7] It was used to have the functions of nourishing, alleviating pain, eliminating phlegm, and relieving coughing.[6] The canvas of the pharmacological activities when complied it stands out strongly as a drug of choice in various disorders.[2] The main taproot, which is harvested for medical use is soft, fibrous, and has a bright yellow interior.[7]

Licorice contains more than 20 triterpenoids and nearly 300 flavonoids.[1] Among them, glycyrrhizin (GL), 18-beta-glycyrrhetinic (GA), liquiritigenin (LTG), licochalcone A (LCA, licochalcone E (LCE) and glabridin (GLD) are main active components which possess antimicrobial and anti viral activities.[1,8,9] Thus, a thorough literature review was conducted to assess various effects of licorice root in orodental diseases.

METHOD

Published literature in English on effects of licorice in oro dental disease was taken into study for the review. Articles were identified through pubmed, google scholar and World Health Organization website using MeSH terms licorice root, dentistry, oral diseases. With this combination a total of 210 abstracts appeared. Only original articles, in vitro and in vivo studies and review articles were taken into consideration in this review. The articles whose only abstracts were available or studies reporting effects of licorice other than oral diseases were excluded. After applying inclusion and exclusion criteria only 23 articles were fulfilled the criteria which were included in the current review.

RESULTS

Uses of licorice root in various orodental diseases are summarized as follows

DENTAL CARIES:

Licorice aqueous extract , ethanolic extract and supercritical fluid extract have potent effects in inhibiting the activities of gram positive and gram-negative bacteria such as S aureus, E coli, P aeruginosa, C albicans and B subtilis.[1]

Sedighinia F et al[10]conducted an in vitro study to analyse antibacterial activity of glycyrrhiza glabra on oral pathogens which showed that glycyrrhiza glabra extract showed good antibacterial activity against six bacterias including Streptococcus mutans, Actinomyces viscous, E coli, Streptococcus aureus and Streptococcus sanguis.

Sug J A et al[11] conducted an in vitro study to analyze the antimicrobial effects of deglycyrrhizinated licorice root extract (DG-LRE) on streptococcus mutans UA159 in both planktonic and biofilm cultures and concluded that it has strong antimicrobial activity against S mutans in planktonic phase. In addition, DG-LRE significantly inhibited biofilm formation by S mutans UA-159 at concentration over 4ug/ml for glucose or 16ug/ml for sucrose respectively, regardless of presence of saliva coating.

Segal R et al [12] conducted a study to check anticariogenic effect of licorice and glycyrrhizin by inhibiting in vitro plaque formation by S mutans and concluded that Initial phase of plaque formation (adherence) was completely inhibited at 0.5-1% glycyrrhizin.

Lingaraj S et al[8] conducted an in vitro study to compare the efficacy of aqueous and alcoholic licorice root extract against Streptococcus mutans and Lactobacillus acidophilus in comparison to chlorhexidine and concluded that the inhibitory effect shown by alcoholic liquorice root extract against Streptococcus mutans and Lactobacillus acidophilus was superior when compared to that of aqueous form and chlorhexidine.

WM Edgar[13] conducted an in vitro study to assess reduction in enamel dissolution by licorice and glycyrrhizinic acid and concluded that licorice extract and confections reduced enamel dissolutions in acid buffer and saliva/ glucose incubations by a direct effect on solubility and by inhibiting the fall in ph on incubation. These actions may be attributed to solubility reducing, glycolysis inhibiting and buffering properties of glycyrrhizin acid, a constituent of liquorice.

Peter MC et al [14] conducted a pilot study know the effects of liquoice in prventing caries in pre-school children in which sugar free lollipop containing licorice roots extract were given twice daily for 3 weeks to children divided in 3 groups using baseline S mutans level as risk indicator. Comparison was done at baseline, during intervention and 9 weeks post intervention. They concluded that twice daily use of herbal liquorice lollipop significantly reduced, the number and relative percentage of S mutans in high-risk children for 22 days which then stabilized and begin to rebound.

Jain E et al[15] conducted a randomized controlled trial on 60 pediatric patients aged 7-14 years to check the cariostatic effect of licorice root extract. The children were divided in three groups to receive aqueous liquorice mouthwash(15%), ethanolic liquorice mouthwash(3.75%) and chlorhexidine mouthwash(0.2%) respectively. A baseline pre rinse and three post rinse saliva samples were evaluated to check changes in pH and streptococcus mutans colony counts. The result of the study showed that highest number of fall in streptococcus mutans colony counts was observed in ethanolic liquorice group and at the same time palatable by child patients.

GINGIVITIS AND PERIODONTITIS:

Vu Dang La et al[16] conducted a study on modulation of matrix metalloproteinase and cytokine production by licorice isolates Licoricidin(LC) and Licorisoflavin A (LIA). Inflammatory cytokines and matrix metalloproteinase(MMP) produced by resident and inflammatory cells in response to periodontal pathogens play a major role in tissue destruction in periodontitis. They have reported that LIA and LC inhibited the secretion of interleukin 6 and chemokine in a dose dependent manner and hence can have potential for the development of novel host modulating Strategies for the treatment of cytokinin and MMP mediated disorders such as periodontitis.

A study by Farhad SH et al[17] compared the effect of adjunctive low dose doxycycline and licorice on gingival crevicular fluid Matrix metalloproteinase (MMP) 8 levels in patients with chronic periodontitis. The decrease in mean MMP 8 concentration was higher in doxycline and liquorice group in comparison with the placebo group and concluded that licorice extract can prevent the production of MMP by host cell and can be useful as antibiotic like doxicycline to cure peridontitis and other inflammatory diseases, with no side effects.

ORAL FUNGAL INFECTION:

In a study by R Geetha and R Anitha on in vitro evaluation of antimycotic activity of ethanolic extract of Glycyrrhiza glabra, the results clearly indicated the antifungal activity of ethanolic extract of glycyrrhiza glabra on organisms like candida albicans, aspergillus fumigates, aspergillus Niger, mucus species and Penicillium marneffei which could be enhanced with purified active components and determined adequate dose for proper administration.[18]

An in vitro and in vivo study conducted by Seleem D et al[19] to check the antifungal activity of Lichochalcone –A against candida albican biofilm. Lichochalcone –A is a bio active natural compound found in licorice root. The result of the study showed that 625µM Lichochalcone –A significantly reduced biofilm growth compared to control group by reducing colony forming units and reducing activity of proteolytic enzymes.

ORAL ULCERS:

Messeier C et al[20] in the article on Licorice and it's potential beneficial effects in common orodental diseases stated that liquorice and its bioactive ingredients such as glycyrrhizin, glabidin, licochalcone A, licoricidin and licorisoflavan A possesses potential beneficial effects in oral diseases including recurrrent aphthous ulcer.

Jain N et al[5] stated that compounds derived from liquorice root have been shown to help to fight against ulcers according to researchers.

ORAL CANCER:

Rafi M et al[21] stated that novel polyphenols molecule isolated from liquorice root induces apoptosis, G2/M cycle arrest, and BCL-2 phosphorylation in tumor cell lines.

ORAL LICHEN PLANUS:

Sinha D and Sinha A reported that liquorice extract was as effective as triamcinolone acetonide to treat oral lichen planus [22]

TMJ ANKYLOSIS:

Kim KR et al[23] conducted a study to analyze the anti-inflammatory effects of licorice and roasted licorice extracts on 12-O-tetradecanoylphorbol-13-acetate (TPA) induced acute inflammation and collagen induced arthritis in mice and suggested that supplementation with licorice extract (LE) and roasted licorice extract(rLE) may be beneficial in preventing and treating both acute and chronic inflammatory conditions like arthritis.

AS INTRACANAL MEDICAMENT:

Sinha D and Sinha A stated that liquorice has shown greater biocompatibility with fibroblast cells compared to calcium hydroxide, which is severely toxic to cells. Hence a mixture of liquorice and Calcium Hydroxide can be used to minimize toxicity to fibroblasts. [22]

CONCLUSION

Recognizing the importance of broadening Western medical perspectives, the World Health Organization has recommended that traditional health and folk medicine systems to be integrated with modern medical therapies to more effectively address health problems worldwide. Because of emergence of multiple drug resistant strains, the focus of drug manufacturers is on herbal products. This review hopefully can throw light on the uses of licorice in various oral dental diseases. As demonstrated by the examples included in this review, due to anti inflammatory, cariostatic, antibacterial, antiplaque, antiviral, antimycotic, ulcer healing, antitumor properties, licorice can prove to be beneficial to treat various oral diseases.

Ongoing clinical Investigation on oral health care benefits of licorice root extract is sure to bear rich fruits.

REFERENCES

[1] Wang L, Liu C. The antiviral and antimicrobial activities of licorice, a widely used Chinese herb. Acta Pharm Sin B. 2015 July;4:310-15.
[2] Korhalkar A, Deshpande M, Lele P, Modak M. Antimicrobial activity Of Yasthimadhu (glycyrrhiza glabra L.)-A review. Int J Curr Microbiol App Sci 2014;3(1):329-336
[3] Dubey D, Sahu MC, Rath S, Paty BP, Debata NK, Padhy RN. Antimicrobial activity of medicinal plants used by aborigines of Kalahandi, Orrisa, India against multidrug resistant bacteria. Asian Pac J Trop Biomed 2012;2(2)suppl: 846-54.
[4] Hegde V, Kesaria DP. Comparative evaluation of antimicrobial activity of neem, propolis, turmeric, licorice and sodium hypochlorite as root canal irrigants against E fecalis and C Albicans- An invitro study. Endodontology, 2013 Dec;25(2):38-45.
[5] Jain N, Rajwar YC, Batra M, Singh HP, Bhandari R, Agrawal P. Dentistry: Turning towards Herbal Alternatives: A review. Sch J App Med Sci 2014;2(1C):253-57.
[6] L Zeng, SH Li, ZC Lou. Morphological and Histological studies of Chinese licorice. Acta Pharma Sin 1988;23:200-08.
[7] Olukoga A, Donaldson D. The history of licorice: the plant, its extract, cultivation and commercialization and etymology. J Roy Soc Health 1998;118:300-04.
[8] Lingaraj S, Battur H, Shamarao S, Sivakumar V, Patil PU, Shanavas P. Effects of Aqueous and alcoholic licorice root extract against S mutans and L acidophilus in comparison to Chlorhexidine: An in vitro study. J Int Oral Health 2014 Jan; 6(4):29-34.
[9] Fenwick GR, Lutomski J, Nieman C. Licorice, Glycyrrhiza glabra L- composition, uses and analysis. Food chem 1990 ; 38(2):119-143.
[10] Sedighinia F, Safipor A, Soleimanpour S, Zarif S, Asili S, Ghazvini K. Antibacterial activity of glycyrrhiza glabrglabra on oral pathogens: an in vitro study. Avicenna J Phytomed 2012;2(3):118-124.
[11] Ahn SJ, Cho RJ, Kim HJ, Park SM, Lim YK, Look YK. The antimicrobial effects of degycyrrhizinated licorice root extract on Streptococcus mutans UA159 in both planktonic and biofilm cultures. Anaerobe 2012 Dec;18(6):590-596.
[12] Segal R, Pisanty S, Wormser R, Azaz E, Sela MN. Anticariogenic effect of licorice and glycyrrhizin : Inhibition of in vitro plaque formation by S mutans. J Pharm Sci 1985 Jan; 74(1):79-81.
[13] WM Edgar. Reduction in enamel dissolution by licorice and glycyrrhizinic acid. J Dent Res 1978 Jan; 1 :1-5.
[14] Peter MC, Tallman JA, Braun TM, Jacobson JJ. Clinical reduction of S mutans in

preschool children using a novel licorice root extract lollipop: A pilot study. Eur Arch Paediatr Dent 2010; 11(6):274-79.
[15] Jain E, Pandey RK, Khanna R. Liquorice root extracts as potent cariostatic agents in pediatric practice. J Indian Soc Pedod Prev Dent 2013 Jul-Sep;31(3):146-52.
[16] Vu Dang La, Tanabe S, Bergeron C, Gafner S, Grenier D. Modulation of Matrix metalloproteinase and cytokine production by licorice isolates Licoricidin and Licorisoflavin A: potential therapeutic approach for periodontitis. J Periodontol 2011 Jan;82(1):122-128.
[17] Farhad SH, Aminzadeh A, Mafi M, Barekatain M, Nagheney M, Ghafr MR. The effect of adjunctive low dose doxycycline and licorice therapy on gingival crevicular fluid MMP 8 levels in chronic periodontitis. Dent Res J 2013 Sep-Oct;10(5):624-29.
[18] Geetha RV, Roy A. In vitro evaluation of antimycotic activity of ethanolic extract of glycyrrhiza glabra. Asian J Pharm Clin Res 2013;6(3):205-207.
[19] Seleem D, Benso B, Noguti J, Pardi V, Murata RM. In vitro and in vivo antifungal activity of Lichochalcone-a against candida albicans biofilms. PLos One 2016;11(6):e0157188. Available from: http://www.ncbi.nlm.nih.gov/ pmc/articles/ PMC4902220. Acccessed April 3,2018
[20] Messeier C, Epifano F, Genovesa S, Grenier D. Licorice and its potential beneficial effects in common orodental diseases. Oral diseases 2012 Jan;18(1):32-39.
[21] Rafi M, Vastano BC, Zhu N, Ho CT, Ghai G, Rosen R et al. Novel polyphenol molecule isolated from licorice root induces apoptosis, G2/M cell cycle arrest and Bcl2 phosphorylation in tumor cell lines. J Agric. Food Chem. 2002;50(4):677-84.
[22] Sinha D, Sinha A. Natural medicaments in dentistry. An international quarterly journal of research in Ayurveda 2014;35(2):113-18
[23] Kim KR, Jeong CK, Park KK, Choi JH, Park JY, Lim SS et al.Anti-inflammatory Effects of Licorice and Roasted Licorice extracts on TPA induced Acute Inflammation and Collagen induced Artheritis in Mice. J Biomed Biotechnol 2010. Available from: http://dx.doi.org/10.1155/2010/709378. Accessed March 7, 2018