International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 3 May-June 2023, pp: 713-720 www.ijprajournal.com ISSN: 2249-7781

Comprehenshive Study of Herbal Leaf Extract Used For Carrries Prevention

Tushar Agrahari1 ,Shashikant Maury2* , Dr. Mohd Wasiullah3 ,Piyush Yadav4
Department of Pharmacy, Prasad Institute of Technology, Jaunpur (222001), U.P, India Associate Professor, Department of Pharmacy, Institute of Technology, Jaunpur (222001), U.P, India
Principal, Department of Pharmacy, Prasad Institute of Technology, Jaunpur (222001), U.P., India.
Principal, Department of Pharmacy, Prasad Polytechnic, Jaunpur (222001), U.P., India

Submitted: 05-05-2023 Accepted: 15-05-2023

ABSTRACT
Tooth decay is one of Germany's most prevalent diseases people. Endogenous oral bacterial species reproduce one major role in the initiation and progression of caries. Effectively prevent tooth decay accomplished by mechanical plaque removal, or chemicals. These chemicals used in toothpaste or mouthwash formunwanted side effects such as tooth discoloration taste, toxic effects on connective tissue, dry and sore mouth, especially in children, this leads to oral desquamation soon with the steady increase in antibiotic resistance chemical exposure and side effects, Bringing new horizons to the field of alternative medicine open. natural products have tried to prevent an ancient oral disease. What is herb Lacking the woody tissue characteristic of shrubs, or wood. Herbs are medicinal plants used as an effective source of therapy various disease processes. Herb Leaf Extract is Consists of structurally dissimilar materials It shows a wide range of biological activity herbal extracts have recently gained importance Various areas of dentistry such as rinses, etc

I. INTRODUCTION

Dental caries is one of the widespread devastating diseases affecting manhood. Oral microorganisms play a vital role in their initiation and progression. It can be prevented by mechanical plaque removal or by the use of chemical agents (dentifrices or mouth rinses).1 Although chemical plaque control methods are effective, they cause side effects like staining of teeth, altered taste sensation, toxic effect on connective tissues, dryness and soreness of oral cavity and oral desquamation, especially observed in children.2,3 To overcome these problems, recently alternative dentistry using natural products are being evaluated. Literature review has demonstrated the efficacy of various herbal leaf extracts such as Tulsi, Neem, Guava, Aloe vera, Pudina, Green and Oolong tea, over the chemical agents such as chlorhexidine and sodium fluoride. Their phytochemical constituents play a major role in the inhibition of oral bacteria. This update is an attempt to outline the role of herbal leaves in dentistry.

MATERIAL:-

TULSI (OCIMUMSANCTUM):-

Tulsi, also known as the "Queen of Herbs" or "Mother Medicine of Nature", is a traditional herb with rich antimicrobial properties that have been used to treat various illnesses. Its dried and powdered leaves have been used for brushing teeth, and a paste made from tulsi leaves and mustard oil is used as a toothpaste. Tulsi leaves contain 0.7% volatile oil, which includes eugenol (about 71%), methyl eugenol (20%), carvacrol, sesquiterpine hydrocarbon, caryophyllene, linolenic acid, ursolic acid, cirsilineol, circimaritin, isothymusin, apigenin, rosameric acid, luteolin, molludistin, and monoterpenes. Additionally, flavonoids such as orientin and vicenin are also present in tulsi leaves.

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 3 May-June 2023, pp: 713-720 www.ijprajournal.com ISSN: 2249-7781

fig no.1Tulsi leaf

EXTEACTION METHOD OF TULSI LEAF

The essential oils of Tulsi were extracted by hydro-distillation by using Clevenger's type apparatus.two hundred grams of dried Tulsi leaves were put in a 5 L round-bottomed flask and were filled with de-ionized water up to two-thirds marks of the flask.

Herbal Leaves and its Phytochemical constituents

1. ***Ocimum sanctum* (Tulsi):** 0.7% volatile oil (71% eugenol and 20% methyl eugenol), carvacrol, sesquiterpine hydrocarbon, caryophyllene and ursolic acid.

2. ***Azadirachta indica* (Neem):** Nimbidin, nimbin, nimbinin, nimbolide, nimbidic acid, alkaloid margosine, resins, calcium, fluoride, silica, tannins.

3. ***Psidium guajava* (Guava):** Tannins, phenols, triterpenes, flavonoids, essential and fixed oils, saponins, carotenoids, lectins, vitamins, alkaloids, reducing sugars and glycosides.

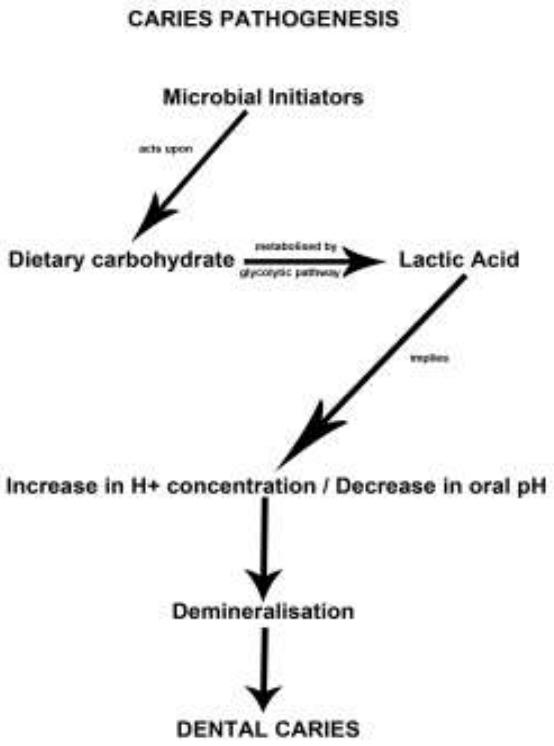
4. ***Aloe Barbadensis* (Aloe vera):** Water (98-99%), active compounds (1-2%) - aloesin, aloin, aloe emodin, aloemannan, acemannan, aloeride, naftoquinones, methylchromones, flavonoids, saponin, sterols, amino acids and vitamins.

5. ***Camellia sinensis* (Green tea):** Polyphenols, Epigallocatechin -3 gallate (EGCG), alkaloids, flavonoids, terpenoids, vitamins, proteins, minerals, lipid, fiber, carbohydrates, amino acids, pigments, phenolic compounds, catechins, tannins and gallic acid

6. ***Camellia sinensis* (Oolong tea):** Alkaloids, tannins, saponins, flavanoids

7. ***Mentha Piperita* (Pudina):** Terpinene, piperitenone oxide, menthol, piperitone, pinene, menthone, menthyl acetate.

Table 1: Phytochemical constituents of herbal leaves



International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 3 May-June 2023, pp: 713-720 www.ijprajournal.com ISSN: 2249-7781

decay caused by Streptococcus mutans. Ursolic acid and carvacrol are two substances found in tulsi that contribute to its antimicrobial activity.

In a review of tulsi conducted in 2010, Pandey G found that the fixed oil obtained from tulsi had good antibacterial activity, likely due to its high linolenic acid content.

Additionally, a literature review by Mahantesh P et al highlighted the medicinal benefits of tulsi and its effective antibacterial potential against oral pathogens.

A systematic review conducted by Nagappan et al evaluated the antimicrobial efficacy of herbal and chlorhexidine mouth rinses against Streptococcus mutans and found that herbs such as tulsi, triphala, pudina, neem, clove oil, and ajwain, used alone or in combination, were proven to be safe and effective in preventingtooth decay caused by Streptococcus mutans decay, bleeding gums, mouth ulcers and halitosis.

MATERN
(AZADIRACHTAINDICA)

It is interesting to note the various components of Azadirachta indica and their actions in preventing dental caries. The fluoride content of Azadirachta indica, for example, is known to exhibit maximum antimicrobial activity against Streptococcus mutans, which is a major causative organism for dental caries. Silica in Azadirachta indica helps prevent the accumulation of plaque while alkaloids exert an analgesic action. Tannins exert an astringent effect and form a coat over the enamel, thus protecting against tooth decay. Additionally, Azadirachta indica inhibits water-insoluble glucan synthesis, induces bacterial aggregation of various oral streptococci, and alters bacterial adhesion and ability of microorganisms to colonize. These properties of Azadirachta indica make it a potential treatment for dental caries.

Fig no.2 Neem Leaf

EXTRACTIONMETHODOFNEEMLEAF:
The extraction of neem leaves was successfully done by Soxhlet and immersion techniques. These extractions are implemented to separate compounds based on their relative solubility in two different immiscible liquids, usually water and organic solvent.

MATERIAL:-
GUAVA (PSIDIUM GUAJAVA):-

Psidium guajava, also known as guava, is a shrubby evergreen plant whose leaves are traditionally used to treat oral health problems such as bleeding gums and mouth sores. Studies have found that guava contains a variety of bioactive substances, including tannins, phenols, triterpenes, flavonoids, essential andfixed oils, saponins, carotenoids, lectins, vitamins, alkaloids, reducing sugars and glycosides. Guava extracthas been found to possess antioxidant properties attributed to its polyphenol content, which iseffective in neutralizingvolatile sulfur compounds responsible for causing halitosis or bad breath. Chewing sticks made from guava are also considered effective in cleaning teeth, and their users are often reported to have strong, clean teeth with no dental plaque or caries. In addition, studies have shown that aqueous extract of Psidium guajava leaves exhibits

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 3 May-June 2023, pp: 713-720 www.ijprajournal.com ISSN: 2249-7781

antimicrobial activity, indicating its potential as a mouthwash for commercial use.

Fig no.3 Guava leaf

EXTRACTION METHOD OF GUAVA LEAF

The guava leaf powder (20 g) was boiled at 90 °C in 100 mL of double distilled water in sterile Erlenmeyer flask (150 mL) for 30 min. The mixture was centrifuged at 4000 rpm for 10 min (Biswas et al. 2013). The supernatant was separated and stored at 4 °C for further studies**.**

MATERIAL:-
ALOE VERA (ALOEBARBADENSIS):-

That's interesting! It seems that aloe vera gel has been shown to have inhibitory activity against certain bacteria that can cause dental caries and periodontitis. This is likely due to the antibacterial and anti-inflammatory properties of the plant's active compounds, including aloin, aloe-emodin, and saponins. It's amazing how many different beneficial compounds can be found in a single plant.

Fig no.4 Aloe vera

EXTEACTION METHOD OF TULSI LEAF

Generally, extraction in hot water and ethanol is the classic, most convenient method of laboratory extraction, and has been widely used in industry [29,33]. Briefly, the water exaction method includes cleaning, homogenization, separation, and centrifugation of Aloe vera**.**

MATERIAL:-
GREEN TEA (CAMELLIA SINENSIS):-

Green tea appears to have several potential benefits for dental health, including reducing plaque accumulation, inhibiting bacterial growth and glucosyltransferase activity, and reducing halitosis. This is due to its high content of polyphenols, alkaloids, flavonoids, vitamins, proteins, minerals, lipids, fiber, carbohydrates, amino acids, pigments, phenolic compounds, catechins, and gallic acid. Catechins, in particular,

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 3 May-June 2023, pp: 713-720 www.ijprajournal.com ISSN: 2249-7781

have been found to be effective against Streptococcus mutans, a bacterium associated with tooth decay, while EGCG has been shown to inhibit the growth of Porphyromonasgingivalis, which is linked to periodontal disease. In addition, alkaloids in green tea are believed to interfere with microbial cell division, while flavonoids inhibit bacterial adherence and tannins inhibit bacterial growth by binding to iron and inhibiting glucosyltransferase activity. Green tea mouthwash has also been found to be effective at reducing plaque accumulation, with fewer side effects compared to chemical mouthwashes.

Fig no.5 Green leaf

EXTRACTION METHOD OF GREEN TEA LEAF

For hot water extraction, the green tea powder (0.50 g) and 85 °C water (18 mL) were mixed in a 50 mL centrifuge tube with a certain liquid/solid ratio, and the extraction was carried out at room temperature (25 °C) for a certain time. After extraction, the crude extract was centrifuged at 12,000× g for 10 min.

MATERIAL:-

OOLONG TEA (CAMILLIA SINENSIS):-

It's interesting to learn about the antimicrobial and inhibitory properties of oolong tea extracts on S. mutans. It seems that the polyphenols in oolong tea extracts play a crucial role in inhibiting GTFase activity and S. mutans adherence, which can help prevent plaque accumulation and caries formation. It's also noteworthy that oolong tea extracts contain unknown polymeric polyphenols, which exhibit the most prominent inhibitory action among various tea extracts. Further research on the identification and characterization of these polymeric polyphenols may help develop more effective preventive and therapeutic strategies against dental caries.

Fig no.6 oolong leaf

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 3 May-June 2023, pp: 713-720 www.ijprajournal.com ISSN: 2249-7781

EXTRACTION METHOD OF GREEN TEA LE

Clove leaf essential oil is obtained by the steam distillation of leaves of Eugenia caryophyllata. The oil is a free-flowing liquid that is colourless to pale yellow in colour. It has a characteristic spicy, powdery, herbal odour. Caryophyllene and Eugenol are its major components.

MATERIAL:-

PUDINA (MENTHA PIPERITA):-

Yes, that's correct. Pudina, also known as mint, contains various phytochemicals that have medicinal properties, including menthol, terpinene, piperitenoneoxide, piperitone, pinene, menthone, menthyl acetate, and ketones. Among these, menthyl acetate and ketones are responsible for its antimicrobial activity against various microorganisms, including Streptococcus mutans, which is associated with dental caries. In addition, its menthol component acts as a biologically active antioxidant. Pudina leaf extract has been shown to have antimicrobial activity against planktonic cells of S. mutans and inhibitory effects on plaque formation.

Fig no.7Mentha pippermint

II. DISCUSSION:-

The passage discusses the use of herbal medicine for dental health. The focus is on the antimicrobial activity of various herbal extracts against cariogenic pathogens such as Streptococcus mutans and Lactobacillus acidophilus, which are the main cause of dental caries. The studies mentioned in the passage evaluate the effectiveness of herbal extracts such as tulsi, neem, guava, Aloe vera, and green tea in inhibiting the growth of these pathogens. The results of these studies suggest that herbal extracts have potential as alternative therapies for the prevention and treatment of dental caries.

III. CONCLUSION:

Due to comprehensive study of herbal leaf extract found that oolong extract is best for carries prevention to all of given leaf extract.

It is encouraging to see a growing interest in natural and herbal products for dental health. However, it is important to note that not all herbal remedies are safe or effective. More research is needed to evaluate the efficacy and safety of these remedies, and to identify any potential interactions with medications or other medical conditions.

In addition, it is important to emphasize that herbal remedies should not be seen as a substitute for proper oral hygiene practices, such as regular brushing and flossing, and routine dental check-ups. These practices are essential for maintaining good oral health and preventing dental caries and other oral health problems.

Overall, it is promising to see a shift towards natural remedies in dentistry, but caution should be exercised when using these products, and further research is needed to determine their safety and effectivenes

REFERENCES

[1]. Kayalvizhi G, Suganya G, Balaji Subramaniyan R. A Cuppa for Caries Free Teeth?International Journal of

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 3 May-June 2023, pp: 713-720 www.ijprajournal.com ISSN: 2249-7781

Contemporary Medical Research 2014;1(1) 19-27.

[2]. Fani M, Kohanteb J. Inhibitory activity of Aloe vera gel on some clinically isolated cariogenic and periodontopathic bacteria. Journal of Oral Science 2012;54:15-21.

[3]. Jeon JG, Rosalen PL, Falestta ML, Koo H. Natural products in caries Research: Current (limited) knowledge, challenges and future perspective. Caries Res 2011;45:243-263.

[4]. Kukreja BJ, Dodwad V. Herbal Mouthwashes – A Gift of Nature. International Journal of Pharma and Bio Sciences 2012;3:46-52.

[5]. Shama NS. A Mine of Medicinal User: Ocimum Sanctum, The Holy Basil. International IJPRR. 2012;2:69-74.

[6]. Pandey G, Madhuri S. Pharmacological activities of Ocimum Sanctum (Tulsi): A review. Int J Pharm SciRev Res. 2010;5(1):61-66.

[7]. Mahantesh P, AhiyaAnnapuma V, Ahuja Vipin A. Tulsi: Is it an important herb in Dentistry? – A review. Journal of Pearl Dent 2011;2:18-21.

[8]. Nagappan N, John J. Antimicrobial Efficacy of Herbal and Chlorhexidine Mouth rinse -A systematic review. JDMS 2012;2(4):5-10.

[9]. Neelakantan P, Jagannathan N, Nazar N. Ethnopharmacological approach in Endodontic Treatment: A Focused Review. Int. J. Drug Dev. & Res., 2011;3:68-77.

[10]. Prashant GM, Chandu GN, Murulikrishna KS, Shajiulla MB. The effect of mango and neem extract on four organisms causing dental caries: Streptococcus mutans, Streptococcus salivarius, Streptococcus mitis, and Streptococcus sanguis: An in vitro study. Indian J Dent 2007;18:148-151.

[11]. Dhinahar S, Lakshmi T. Role of Botanicals as Antimicrobial Agents in Management of Dental Infections – A Review. International Journal of Pharma and Bio Sciences.2011;2:690- 704.

[12]. PackiaLekshmi NCJ, Sowmia N, Viveka S, J. Raja Brindha J, Jeeva S. The inhibiting effect of Azadirachta indica against dental pathogens Asian J. Plant Sci. Res 2012; 2:6-10.

[13]. Bohora A, Hedge V, Kokate S. Comparison of the antibacterial efficiency of Neem leaf extract and 2% sodium hypochlorite against E.faecalis, C.albicans and mixed culture – An in vitro study. Endodontology Pg 10-14.

[14]. Botelho MA, Santos RAD, Martins JG, Carvalho CO, Paz MC, Azenha C, Ruela RS, Queiroz DB, Ruela WS, Marinho G, Ruela FI. Efficiency of a mouthrinse based on leaves of neem tree (Azadiractaindica) in the treatement of patients with chronic gingivitis . A double – blind, randomized controlled trial. J of medicinal plants research 2008;2: 341– 346.

[15]. Esimone CO. A case for the use of Herbal extracts in oral Hygine: The efficacy of Psidium guajava – Based Mouthwash formulations. Res. J.Applied Sci 2007;2:1143- 1147.

[16]. Vogler BK, Ernst E. Aloe vera: a systematic review of its clinical effectiveness.British Journal of General Practice 1999;49:823-828.

[17]. Barandozi FN. Antibacterial activities and antioxidant capacity of Aloe vera. Organic and Medicinal Chemistry Letters 2013;3:5

[18]. Venkateswara B, Sirisha K ,Chava VK .Green Tea extract for periodontal health.Journal of Indian Society of Peridontology 2011;15:18-28.

[19]. Subramanium P, Eswara U, Maheshwara RKR . Effect of different types of tea on streptococcus mutans: An in vitro study. Indian J of Dental Research 2012;23:43–48.

[20]. Nakahara K, Kawabata S, Ono H, Ogura K,Tanaka T, OoshimaT, Hamada S. Inhibitory Effect of Oolong Tea Polyphenols on Glucosyltransferases of Mutans Streptococci. Applied and Environmental Microbiology1993:968-973.

[21]. Chaudhary NJ, Ajit Krishnan CG, Thanveer K, Shah H. Anti-microbial effect of Pudina extract on Streptococcus mutans: In–vitro study. J. Int Oral Health 2012;4:45-49

[22]. Agarwal P, Nagesh L, Krishnan M. Evaluation of the antimicrobial activity of various concentrations of tulsi (Ocimum sanctum) extract against Streptococcus mutans; an in vitro study. Indian J Dent Res 2010;21:357- 359.

[23]. Agarwal P, Nagesh L. Comparative Evaluation of efficacy of 0.2% chlorhexidine, Listerine and Tulsi extract mouth rinses on salivary Streptococcus mutans count of high school children – RCT. Contemp Clin Trails 2011;32:802-808.
[24]. Siswomihardjo W, Badawi SS, Nishmura M, Hamada T. The difference of antibacterial effect of neem leaves and stick extracts. Int Chin J Dent 2007;7:27-30
[25]. Chatterjee A, Saluja M, Singh N, Kandwal A. To evaluate the antigingivitis and antipalque effect of an Azadirachta indica (neem) mouthrinse on plaque induced gingivitis: A double-blind, randomized, controlled trial J Indian Soc Periodontol. 2011;15:398-401.
[26]. Anitha Rani A, Punitha SMJ, Sangeetha G. In vitro comparison of the antimicrobial activity of two varieties of Psidium guajava against dental caries causing pathogen. Advances in Applied Science Research, 2013;4:15- 18
[27]. Garode AM, SM Waghode Antibacterial Activity of Guava Leaves Extracts Against S. Mutans. Int. J. Bioassays 2014;3:3370-3372
[28]. Cock I. Antimicrobial Activity of Aloe barbadensis Miller Leaf Gel Components. The Internet Journal of Microbiology 2007;4:1-11
[29]. Araghizadeh A, Kohanteb J, Fani MM. Inhibitory Activity of Green Tea (Camellia sinensis) Extract on Some Clinically Isolated Cariogenic and Periodontopathic Bacteria. Med PrincPract2013;22:368-372
[30]. Tehrani MH, Asghari G, Hajiahmadi M. Comparing Streptococcus mutans and Lactobacillus colony count changes following Green tea mouth rinse or Sodium fluoride mouthrinse in children. (Randomized double- blind controlled clinical trial. Dental research Journal 2011;8:558-563.
[31]. Ramesh G, Nagarajappa R, Madhusudhan AS, Sandesh N, BatraM, Sharma A, Patel SA. Estimation of salivary and tongue coating pH on chewing household herbal leaves: A randomized controlled trial. Anc Sci Life. 2012;32:69–75.
[32]. Mehta S, Pesapathy S, Joseph M, Tiwari PK, Chawla S. Comparative evaluation of a herbal mouthwash (Freshol) with chlorhexidine on plaque accumulation, gingival inflammation, and salivary Streptococcus mutans growth. Int Soc Prev Community Dent. 2013;3:25–28. 33. Malhotra R, Grover V, Saxena D. Comparison of the effectiveness of a commercially available herbal mouthrinse with chlorhexidine gluconate at the clinical and patient level. Journal of Indian Society of Periodontology 2011;15:349-352.