



Herbal plants in oral health care: A review on current Scenario and its benefits.

¹Miss.Sakshi Dattatray Pawar, ²Miss.Monika Dattatray Isame, ³Miss.Neha Bhaskar Isame, ⁴Mr. Yash Sanjay Patil, ⁵Mr. Ashish Shripat Rothe, ⁶Mr.Sanket S.Gabhale

¹Research Scholar, ²Research Scholar, ³Research Scholar, ⁴Research Scholar, ⁵Research Scholar, ⁶Assistant Professor
¹Pharmacy,
¹Siddhi's Institute Of Pharmacy, Nandgaon,,Murbad,Thane

Abstract : More research has lately been done on herbal products, which is significant for dental products. A significant global health concern that has an economic impact on people in industrialized nations is dental care, which accounts for 10% of health care spending. Nowadays, a lot of people in many countries use herbal items or treatments for their health. the various kinds of medicinal plant species that people employ to cure dental conditions traditionally. In dentistry, herbal extracts have been utilized as antimicrobial agents to reduce inflammation, to stop histamine from being released, and as antiseptics, antioxidants, antibacterial, antiviral, and analgesics, among other uses.[1] Some typical herbal extracts used to treat dental diseases are reviewed below, along with an overview of their bioactivities. We've reviewed the pharmacological, chemical, and therapeutic qualities of ginger root, mimusop elengi, onion, neem, clove, peppermint oil, and guava leaves.

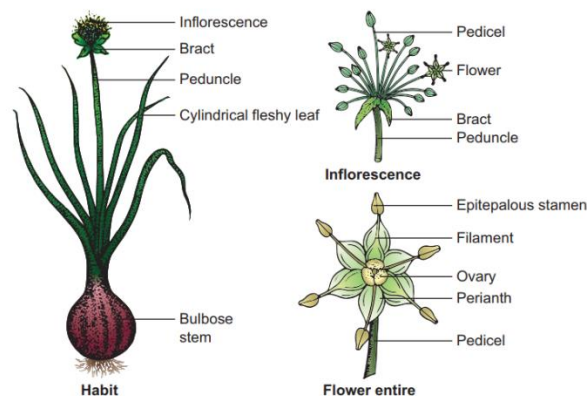
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INTRODUCTION

Many plant species utilized in herbalism are referred to as "medicinal plants" or "herbology or herbal medicine." The Latin word "herba" and the old French word "herb" are the sources of the term "herb." These days, any portion of a plant, including fruit, seeds, stems, roots, bark, flowers, and leaves, is referred to as a herb. [2]Herbal usage were documented in ancient Chinese and Egyptian papyrus manuscripts and unani manuscripts. In several regions of the nation, medicinal plants including aloe, tulsi, neem, turmeric, and ginger are used to treat a variety of common ailments. Herbal plants are regarded as accessible sources of compounds that can be utilized to create synthetic or pharmacopeial medications. Herbs are not just utilized for medicine; they are also used in cuisine, perfume, natural dyes, and pest control. It has been estimated that more than 100 plant species and 2,500 plant species are used as medicinal by traditional healers in India. It has been demonstrated that the Natural Dentist Healthy Gums Daily Oral Rinse, formerly known as Herbal mouth & Gum therapy, has positive benefits on the oral environment, including a decrease in anaerobic bacteria and gingival bleeding. Aloe vera and neem are two of the many naturally occurring anti-inflammatory ingredients in this mouthwash. In her 1992 book "The Herbs of Life," herbalist Lesley Tierra makes the following suggestion: "Twigs contain volatile oils which stimulate blood circulation, cleanse gum tissues, and contain tannins."Herbal extracts have been effectively applied in dentistry to clean teeth, operate as an antimicrobial, stop histamine from being released, and function as an antiseptic, antioxidant, antiviral, and antibacterial etc.[3]

1. Allium cepa: -

Allium cepa (A. cepa) is one most popular herbal medicine in Asia because it shows wide effects. Which is the type vegetable i.e., most widely cultivated species of the genus Allium which belongs to the kingdom plantae. It contains several biochemical compounds like *Allicin*, *Quercetin*, *fisetin*, *sulfurous compounds*, *diallyl disulfide* & *diallyl trisulfides*. An onion contains antioxidants as well as anti-inflammatory drug which reduce the cholesterol level & blood clots. Eating of raw onion can strengthen the teeth and kill of harmful bacteria in the mouth so it acts as antibacterial.[4]



2. Margosa neem: -

It is indigenous and widely grown India. It grows in various tropical and subtropical regions of world. It consists of a leaves and other areal parts of *azadirachta indica*, A. juss, synonym: *Melia azadirachta*. Linn belonging to family meliaceae. [5] Here some organoleptic characters are given: -



Leaves: the leaf-lets are opposite or alternate, obliquely falcate- lanceolate, serrate, dark green to greenish yellow in color and bitter in taste

Flowers: white scented 5 mm long pentamerons, staminal tube dentate inside.

Fruits: they are 1.2 to 1.8 cm long, oblong, 1- seeded smooth greenish yellow color, bitter in taste

Bark: it is an outer covering, rough greyish in color, internal fiber is yellow in color.

It contains different constituents from different parts of neem. Among them the azadirachtin, salannin and meliantriol are the active ingredients. the leaves contain nimboesterol and quercetin. The seed contains azadiractin, salannin, meliantriol and meliacin. The bark of neem contains nimbin, nimboesterol and margosine.

3. Syzygium aromaticum: -

Clove consist of dried flower buds of *Eugenia Caryophyllus* which belongs to the family Myrtaceae . It should contain not less than 15 % (v/w) of clove oil . The main component found to be Eugenol, Caryophyllene , Acetylugenol etc. The drug contains about 15 to 20% of volatile oil, 10 to 13 % of gallotannic acid ,resin, chromone & eugenol. For centuries , clove have been used as a pain relief techniques . Historically treatments called for inserting the clove into an infected tooth or cavity . clove oil is the most popular home remedy which is used in medicine therapy to treat teeth related issues mainly toothache. Clove oil can relieve toothpain & bad breath as well as it help in to reduce gum disease so it act as a dental analgesic .Today ,clove is widely accepted as a reliable solution for day socket & for relieving the pain & discomfort associated with various dental disorders.[6]



4. Peppermint oil :-

Peppermint oil is the volatile oil obtained by steam distillation of the fresh flowering tops of the plant known as *Mentha Piperita* Linn or various species of *Mentha* belonging to the family Labiatae. Mentha oil contains not less than 50% of total menthol. It having a characteristic or pleasant odor. Peppermint having a pungent taste followed by cooling sensation. It is soluble in 70 % alcohol , ether and chloroform and it is insoluble in water. It grows wild in Europe while it is cultivated in Japan , England ,France , Italy ,U.S.A , Bulgaria ,In India , It is cultivated near Jammu and in Uttar Pradesh.It is common flavoring for toothpastes, mouth washes and chewing gums.[7] In addition to its pleasant smell , Peppermint has antibacterial properties that help kill germs that causes dental plague. Peppermint oil can be a great addition to your dental hygiene routine. To use peppermint oil as a supplement in your normal routine of brushing and flossing.The essential oil present in peppermint is most effective in killing what are called anaerobic bacteria, which tend to live in low-oxygen environment. These bacteria tend to cause gums diseases and other oral health problems. Menthol a compound that is present in Peppermint causes the cooling sensation, which is similar to that of brushing your teeth with toothpaste or using mouthwash.



5. Guava Leaves :

Guavas are tropical trees originating in Central America. Their fruits are oval in shape with light green or yellow skin and contain edible seeds. It is an evergreen shrubs or small tree native to the Caribbean, Central America and South America.[8] We all depend on western medicine for simple problems like Fever, Cold, Cough etc. But ,don't forget that guava leaves are very healthy too. If guava fruits is healthy, then its leaves are super healthy.

Guava leaves provide quick, short -term relief for toothaches. The leaf's juice will work into the sore tooth region and relieve the pain. This leaves use it as a mouthwash by boiling the leaves in water and add the salt to boiled solution. The guava leaves are also used to reduce cholesterol level and losing the weight , for good vision and this leaves use to manage the blood sugar levels. This leaves are a rich sources of various health-promoting micro and macronutrients as well as bioactive compounds. They contain 82.47% moisture, 3.64% ash 0.62% Fat, 18.53% protein,12.74% carbohydrates ,103 mg ascorbic acid. Menthol a compound that is present in peppermint, causes the cooling sensation, which is similar to that of brushing your teeth with toothpaste or using mouthwash.



6. Tulsi Leaves:

Ocimum tenuiflorum, commonly known as holy basil or tulsi is an aromatic perennial plant in the family Lamiaceae. It is native to the Indian subcontinent and widespread as a cultivated plant throughout the Southeast Asian tropics. Tulsi is cultivated for religious and traditional medicine purpose, and also for its essential oil. It is widely used as a herbal tea, commonly used in Ayurveda, and has a place within the Vaishnava tradition of Hinduism, in which devotees perform worship of the holy basil plant and its leaves. Some of the phytochemical constituents of tulsi are oleanolic acid, ursolic acid, Rosmarinic acid, eugenol, carvacrol, linalool and β -Caryophyllene. Traditionally tulsi has been employed in hundreds of different formulations for the treatment of a range of disorders involving mouth, throat, lungs, heart, liver, kidney and the digestive, metabolic, reproductive and nervous system.[9] Tulsi has been used as an expectorant, analgesic, anticancer, antiasthmatic, antiemetic, hypotensive and anti-stress agent. The powdered tulsi leaves mixed with mustard oil can be used as toothpaste for teeth brushing. The powdered tulsi leaves are used to combat halitosis and maintain good oral health. Massage with tulsi powder has been reported to be highly effective in many gingival and periodontal diseases. The tulsi extract has high antimicrobial activity against *Streptococcus mutans*. *Streptococcus mutans* has been reported to be a key microorganism causing dental caries.

Tulsi is a rich source of Vitamin A, Vitamin C, zinc and iron. It is also a rich source of chlorophyll and other poly-nutrients. So it can be used as dietary supplements in oral diseases arising due to deficiency of these nutrients.



7. Ginger

Ginger consists of the rhizomes of *Zingiber officinale* Roscoe, family Zingiberaceae, which are scraped to remove the outer skin and dried in the sun. It contains not less than 0.8% of total gingerols on a dried basis.[10] Ginger contains about 1 to 2% of volatile oil, an acrid resinous matter (5-8%) starch. Zingiberene is the principal constituent of the ginger oil. The pungent principle of ginger is gingerol, which is a yellowish oily substance, while shogaol is another constituent of the oil. The pungency of gingerol is destroyed by boiling with 2% potassium hydroxide. Ginger has been used for thousands of years for the treatment of numerous ailments, such as colds, nausea, arthritis, migraines and hypertension. Ginger contains raffinose and gingerol, two compounds that have been shown to help temporarily reduce inflammation and pain. The compound in ginger can also help to reduce the oral bacteria that lead to cavities and gum diseases, making it a generally effective part of an oral health regimen. One of the teeth whitening home remedies includes using ginger because ginger has anti-inflammatory properties that make your mouth tissue healthy. Hence, ginger can be used in toothpaste. The familiar subtle spiciness of ginger boosts blood circulation in the gums and stimulates the flow of saliva.



8. Mimosa pudica:

Many of the medications on the market today either feature structures that are entirely or partially drawn from natural motifs, or they mimic molecules found in nature.[11] Hindus regard *Mimosa pudica* as a sacred plant, and it has been

given significant mention in both religious writings and classical Sanskrit literature. The Puranic celebration of its fragrant blooms even places it among the flowers of the Hindu heaven. It is stated that when Krishna played his flute under a *Mimusops elengi* tree near the banks of the Yamuna, he captivated the milkmaids of Brindaban. As a representation of beauty and love, Kalidasa also used *Mimusops elengi* blossoms into his traditional Sanskrit literature. A small to large evergreen tree that is native to the Andaman Islands and the Deccan Peninsula. It is commonly grown as an ornamental tree in gardens, but it is also grown as an avenue or shade tree in most of India.[12] Because it has so many medical characteristics, it has contributed much to science both historically and in the present.

Taxonomical Classification:

Kingdom: Plantae
Order : Ericales
Family : Sapotaceae
Genus : *Mimusops*
Species : *M. elengi* L

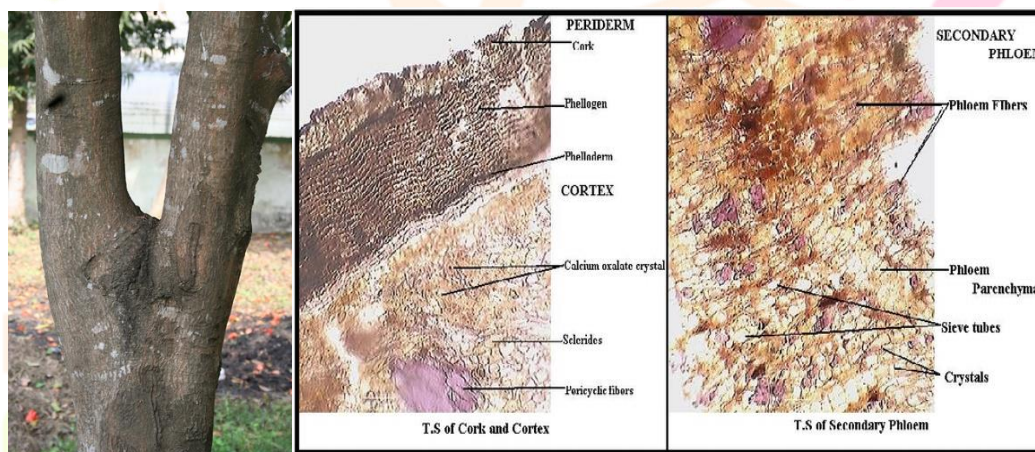
Parts used:

Stem bark, leaves, flowers, fruit and seed

Phytochemical Constituents:

1. Stem bark:

Beta-spinasterol, betulinic acid, taraxerone, taraxerol, betulinic acid and sodium salt, and fatty acid esters of alpha-spinasterol separated itself from the bark. Along with the known triterpenoids, farnan-3-one, olean-18-en-2-one-3-ol, and lup-20(29)-en-3 beta-ol, a new farnan-type pentacyclic triterpene, farnan-2-one-3 betaol (*mimusopfarnanol*), was also identified. Bark was also used to obtain a novel triterpene, 3 β -hydroxy-lup-20(29)-ene-23, 28-dioic acid, beta amyirin, and lupeol. A bark sample subjected to steam distillation produced 0.18% volatile organic materials. Alpha cadinol, tau muurolol, hexadecanoic acid, diisobutyl phthalate, and octadecadienoic acid were the main ingredients. Introducing novel gallic acid esters, such as phenyl propyl gallate.[13]



2. Fruit and seed:

Following saponification, the fruit and seed of *Bakula* displayed the presence of ursolic acid, dihydro quercetin, quercetin, β -D glycosides of β sitosterol, and alphaspinasterol. The unique migrating oleanane skeleton, *mimusopane*, as well as the *mimusops* gene and *mimugenone*, were identified as pentacyclic triterpene acids that were extracted as *mimusops* acid and *mimusopsic* acid. The pentacyclic triterpenes 1 β -hydroxy-3 β -hexanoyllup-20(29)-ene-23, 28-dioic acid and 3 β , 6 β , 19 α , 23-tetrahydroxy-urs-12-ene have been identified. From the seeds of *Mimusops elengi*, two new triterpenoid saponins, *mimusops in* and *mimusops in*, were isolated. Two recognized triterpenoid saponins, *Mi-saponin A* and *16*, were also isolated together with the minor triterpenoid saponin *mimus. beta-hydroxymitochondriamycin A*. [14]

Additionally, two novel triterpenoid saponins, *mimusopside A* and *B*, were discovered. *Taxifolin*, alpha-spinasterol glucoside, and *miglioside 1* were also identified. The seed kernel yielded the isolation of six new saponins. Moisture (79.27%), protein (1.29%), fat (2.76 K Cal), reducing sugar (8.9%), non-reducing sugar (6.3%), total sugar (15.2%), fiber (1.13%), vitamin C (3.27 mg / 100 gm), mineral content (0.32%), iron (0.59 mg / 100 gm), sodium (5.16 mg / 100 gm), and potassium (98.54 mg / 100 gm) are the reported contents of *Bakul* fruit.



3. Leaves, heartwood and roots:

From the leaves, heartwood, and roots, hentriacontane, carotene, and lupeol were separated. 5 alpha-stigmast-9(11) en-3-omega-D-glucopyranosyl (1-5)-O-beta-D-xylofuranoside, a novel steroidal saponin, was extracted from the roots of *mimosa elengi*. [15]



Pharmacology:

The bark has cooling, cardiotoxic, alexipharmic, stomachic, anthelmintic, and astringent properties. It is both pleasant and acrid. This tree's twig is used to wash teeth, and chewing on it for a long time strengthens teeth. It is used in gargles to treat bleeding gums, irritation, and odontopathy. It is also a key ingredient, along with tannin-rich ingredients, in several herbal tooth powders. It is the primary ingredient in "Mahakhadiravati," a herbal treatment for pharyngeal issues, halitosis, spongy gums, and stomatitis. The production of commercial dyes also uses it. The "Kawath" of the bark, when gargled with pepper, honey, and ghee, tightens the loose teeth and lessens pain. Loose teeth can be fixed with seed powder. Even an elderly person's teeth could be strengthened with a three-day root bark decoction eaten with milk in the morning. Nothing strengthens teeth more than prolonged chewing on bark.

M. elengi fruit has an astringent quality. It is well known that the young fruits guard loose teeth. Teeth can also be fixed loosely by using a hot water extract of dried seeds. Astringent, diuretic, and aphrodisiac qualities are also present in the root of *M. elengi*. The teeth and gums are strengthened by the hot aqueous extract. The literature also lists the root's antipyretic qualities.

Clinical applications:

Dental plaque is a biofilm of microorganisms embedded in a matrix of polymers originating from both the host and the bacteria that are seen on the surface of teeth. Pathogens and biofilm accumulation are the main causes of dental plaque development. Because brushing schedules and other oral hygiene practices vary, most people's mechanical plaque removal is insufficient. Consequently, in addition to brushing your teeth, you should use mouthwashes and dentifrices that contain chemical or herbal ingredients to maintain good oral hygiene. Any antiseptic mouth rinse used over an extended period of time might cause negative effects, such as tooth discoloration, altered taste perception, and the emergence of antibiotic resistance. There has been a surge in interest in the role of phytotherapy in oral health, with numerous studies having been carried out in this field. Herbal extracts can be used as a replacement to assist get past these negative effects. It was discovered that a herbal mouthwash made from the aqueous extract of *M. elengi* bark was a highly effective plaque inhibitor. This plant contains tannins, which give any substance its hemostatic and astringent qualities. Enzymes, polysaccharides, proteins, and bacterial cell membranes are among the substances they interact with. As a result, it functions as an anti-plaque agent and prevents plaque from accumulating.

Gum bleeding and dental caries are two oral issues that can be treated or managed using *M. elengi* extract. An accumulation of tartar and plaque causes bleeding gums over time. It has been stated that *M. elengi* is used in Ayurveda to cure bleeding gums. Chewing on an *M. elengi* twig is a well-known cleaning solution. Bark powder is a common ingredient in tooth powder formulations used in Ayurvedic medicine. The bark and seed coat are added to several herbal tooth powders sold

under the brand name "Vajradanti" in order to strengthen the gums. Using the ditch plate method, the chloroform extract shown strong antibacterial activity in a number of dental investigations.

If gingivitis is not treated, it might develop into periodontitis. A hot, aqueous extract of fruit and dry bark is taken orally to treat gingivitis and as an astringent. Gingivitis can be effectively treated with the astringent qualities of *M. elengi*'s fruit and root. Fruits contain triterpenes, which have antibacterial qualities and might be connected to the hydrophobicity mechanism. This makes it possible for non-specific interaction with the phospholipids in Gram-positive bacteria's cell membranes.

It has been demonstrated that *M. elengi*'s fruits and roots work well to treat periodontitis. Teeth that are movable can be treated with unripe fruit and seeds. Plants that have antibacterial properties also produce compounds called saponins, alkaloids, and tannins. The surface-active substances called saponins that are found in bark have the ability to function as surfactants. They have anti-inflammatory, anti-microbial, anti-carcinogenic, and cholesterol-lowering properties. It was discovered that saponins had the strongest anti-histamine effects. When ground into a powder, dried flowers are also used to clean teeth. The capacity of the flavonoids found in *M. elengi* to prevent the formation of eicosanoids is a significant anti-inflammatory characteristic. Eicosanoids called prostaglandins are the end products of the cyclooxygenase and lipoxygenase pathways and are implicated in several immune responses.

Conclusion:

From above studied we concluded that the pharmacological, chemical, and medicinal properties of guava leaves, ginger root, onion, neem, clove, peppermint oil, are used for oral hygiene. But *Mimusop elengi* exhibits more benefits in the dental field than the other herbs. It also strengthens loose teeth, lessens inflammation, odontopathy, bleeding gums, halitosis and stomatitis.

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