

Impact of Guava and Amla on Oral Health: A Review

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Abstract - Amla (Indian gooseberry) and guava leaves have been traditionally used in dental care due to their various beneficial properties. Guava (*Psidium guajava*) and amla (*Phyllanthus emblica*) leaves have been traditionally utilized in various forms of natural medicine, particularly in dental care. This abstract explores the antimicrobial, anti-inflammatory and antioxidant properties of these leaves and their potential benefits in oral health. Guava leaves are rich in flavonoids, tannins, and essential oils, which exhibit potent antibacterial activities against oral pathogens, including *Streptococcus mutans* and *Porphyromonas gingivalis*, common culprits of dental caries and periodontal diseases. The leaves anti-inflammatory properties help reduce gum inflammation and prevent periodontal diseases. Moreover, guava leaves contain analgesic compounds that can alleviate toothache. Similarly, amla leaves are a powerhouse of vitamin C, polyphenols, and flavonoids, which contribute to their strong antioxidant and antimicrobial properties. Amla leaves inhibit the growth of harmful oral bacteria and fungi, thereby reducing plaque formation and preventing oral infections. The high vitamin C content aids in collagen synthesis, promoting healthy gums and preventing bleeding. Both guava and amla leaves can be used in various forms, such as mouthwashes, tooth powders, or as a chewing stick, providing a natural and cost-effective alternative to conventional dental care products. Their integration into daily oral hygiene routines can enhance oral health, prevent dental diseases, and contribute to overall well-being. Clinical research is needed to validate the effectiveness and safety of guava and amla leaves in dental care. Current evidence indicates their potential as natural supplements for maintaining oral hygiene and preventing dental disorders. Both amla and guava leaves offer natural and effective ways to maintain oral health and treat common

dental issues. This review is an effort to compile the pharmacological activities of Guava and Amla.

Key Words: Guava, Amla, *Psidium guajava*, kadu neem, Pharmacological activities, Dental caries.

1.INTRODUCTION

1.1. GUAVA (*Psidium cujavillus*, *Psidium pomiferum* L , *Psidium pumilum* Vahl , *Psidium pyriferum* Linn.)

Common names include guava, lemon guava, mpera, mubera, and mupeera.

Guava is an evergreen shrub widely cultivated around the world. It holds great importance in traditional medicine. Its leaves are rich in essential oils, tannins, flavonoids, phenolic compounds, carotenoids, and vitamin C. Quercetin is the main constituent and shows excellent activity against periodontal pathogens. Flavonoids in guava leaves include high levels of quercetin, saponins, alkaloids, cardiac glycosides, phlobatannins, and anthraquinones, with their concentrations varying based on species, cultivar, and cultivation conditions such as soil type, climate, irrigation, pruning, and other horticultural practices. Guava fruits are commonly used in jams, beverages, and various foods, while the leaves are traditionally employed to treat dysentery, gastroenteritis, diabetes mellitus, stomach aches, and wounds. Guava (*Psidium guajava*) belongs to the Myrtaceae family. The guava tree, which can grow up to 3 meters tall, has fruits, bark, and leaves that are utilized in herbal medicine. For its effectiveness in curing several elements, including the treatment of chronic diarrhea and gastroenteritis, a decoction of its leaves is recognized. The most common use of the leaves is for cleaning and disinfecting wounds by rinsing the affected area with a decoction made from the leaves. It can also be used for ulcers and also as a wash for uterine and

vaginal problems. Leaf decoction may also be used as mouthwash psidium guajava has also been used for the management of various disease like toothache, sore throat, and inflamed gums.

Guava is also shown to exhibit high antibacterial activity against both Gram-negative and Gram-positive bacteria. By inhibiting the growth, adherence, and co-aggregation of dental plaque bacteria, guava extract showed *in vitro* antiplaque actions. Guava extracts can help prevent plaque formation without disturbing the natural balance of the oral cavity. Thus, guava is an excellent antibacterial and antiplaque agent, making it a good adjunct to mainstream periodontal treatment.

These are the some of the properties;

❖ **Antibacterial and Antimicrobial Action:**

Guava leaves contain compounds like flavonoids and guaijaverin, which have antibacterial and antimicrobial properties. They are effective against various oral pathogens responsible for dental caries and gum disease.

❖ **Anti-inflammatory Properties:**

The anti-inflammatory properties of guava leaves can help reduce gum inflammation and pain. This makes them useful in treating conditions like gingivitis and periodontitis.

❖ **Pain Relief:**

Chewing guava leaves or using a guava leaf decoction as a mouthwash can help relieve toothache and gum pain. This is due to the analgesic properties of the leaves.

❖ **Plaque Reduction:**

Guava leaves can help in reducing plaque formation on teeth. Their antimicrobial action helps in preventing the buildup of bacterial biofilms, which are the precursors to plaque and tartar.

❖ **Freshening Breath:**

The natural compounds in guava leaves can help in combating bad breath. Chewing the leaves or using them as a mouthwash can leave the mouth feeling fresh and clean.

Pharmacological activities :-

Psidium guajava, commonly known as guava, is a tropical fruit-bearing plant native to Central America. Various parts of the guava plant, including the leaves, fruits, and seeds, possess pharmacological properties due to their rich phytochemical composition.

Here's an overview of the pharmacological activities associated with different parts of the *Psidium guajava* plant

1.1.1. Guava Leaves:

- ◆ **Antimicrobial Activity:** Guava leaves exhibit broad-spectrum antimicrobial activity against various bacteria, fungi, and viruses. They contain compounds like quercetin, flavonoids, and tannins, which contribute to their antimicrobial properties.
- ◆ **Antidiabetic Effects:** Studies suggest that guava leaf extract may help lower blood sugar levels and improve insulin resistance, making it potentially beneficial for managing diabetes.
- ◆ **Antioxidant Properties:** Guava leaves are rich in antioxidants like polyphenols, which help scavenge free radicals and reduce oxidative stress in the body.

1.1.2. Guava Fruits:

- ◆ **Antioxidant Activity:** Guava fruits are packed with vitamin C, flavonoids, and other antioxidants, which contribute to their ability to neutralize free radicals and protect cells from damage.
- ◆ **Antidiarrheal Effects:** Guava fruit and its extracts have been traditionally used to treat diarrhea. The astringent properties of guava help reduce intestinal inflammation and promote firmer stools.
- ◆ **Anti-inflammatory Properties:** Compounds like quercetin and lycopene found in guava fruits possess anti-inflammatory properties, which may help alleviate inflammatory conditions.

1.1.3. Guava Seeds:

- ◆ **Antimicrobial Activity:** Guava seeds contain bioactive compounds that exhibit antimicrobial activity against various pathogens, including bacteria and fungi.

- ◆ **Anticancer Potential:** Some research suggests that guava seed extracts may possess anticancer properties, potentially inhibiting the growth of cancer cells.
- ◆ **Hypolipidemic Effects:** Guava seed extracts have shown promise in reducing lipid levels in the blood, which can help in managing conditions like hyperlipidemia and cardiovascular diseases.

Overall, the pharmacological activities of different parts of the *Psidium guajava* plant make it a valuable resource in traditional medicine and a subject of interest for modern scientific research. However, further studies are needed to fully understand and harness its therapeutic potential.

1.2. AMLA (*Phyllanthus emblica* , *Emblica officinalis*)

Common name – Nimba, neem tree , kadu neem , margosa , it is also known as the miracle tree.

Amla is also known as Indian gooseberry (*Phyllanthus emblica* or *Emblica officinalis*) belongs to the Euphorbiaceae family, has been renowned since ancient times for its significant role in disease treatment and management. It is rich in various compounds, including tannins, alkaloids, gallic acid, fiber, carbohydrates, and vitamin C, and is a potent source of antioxidants. Amla provides an abundant source of Vitamin C. Hence it helps boost immunity, metabolism, and prevents viral and bacterial ailments, including cold and cough. Its nutritional profile is also enriched with a variety of polyphenols, which are recognized for their ability to combat the development of cancer cells.

Amla fruits are commonly used to treat various ailments due to their antioxidant properties. In both in vivo and in vitro studies, Amla has demonstrated the ability to reduce lipid peroxidation, oxidative stress, and reactive oxygen species while boosting various antioxidant levels and inhibiting pathogenesis. Its health benefits are well-documented, showing antioxidant, anti-inflammatory, hepatoprotective, gastroprotective, anti-diabetic, antimicrobial, neuroprotective, cardioprotective, and immunomodulatory activities. Additionally, various studies have confirmed Amla's role in cancer management. This review systematically encapsulates the therapeutic potential of Amla through extensive in vivo and in vitro research, highlighting its multifaceted benefits in health management. Amla juice

or powder can be used as a mouth rinse. Eating fresh amla or drinking amla juice can provide systemic benefits, improving overall oral health.

Promote healthy hair growth, improve the tone of henna hair dyes , reduce dandruff, treat head lice, help in preventing the premature greying of the hairs , provide nourishment to hairs these are some benefits of amla powder.

Some of its pharmacological activities include:

1. **Antioxidant Activity:**

Amla is rich in vitamin C and polyphenols, making it a potent antioxidant. It helps in scavenging free radicals and protecting cells from oxidative damage.

2. **Immunomodulatory Activity:**

Amla boosts the immune system, enhancing the body's defense mechanisms against infections and diseases.

3. **Anti-inflammatory Activity:**

Amla exhibits anti-inflammatory properties, which can help in reducing inflammation in various parts of the body.

4. **Antimicrobial Activity:**

Amla has antimicrobial properties, which make it effective against a range of bacteria, viruses, and fungi.

5. **Hepatoprotective Activity:**

Amla protects the liver from damage and helps in the regeneration of liver cells. It is beneficial in liver disorders and detoxification.

6. **Cardioprotective Activity:**

Amla is known to have cardioprotective effects by reducing cholesterol levels, improving heart function, and preventing the formation of blood clots.

7. **Neuroprotective Activity:**

Amla has neuroprotective properties, which can help in preventing or slowing down the progression of neurodegenerative diseases like Alzheimer's and Parkinson's.

8. **Antidiabetic Activity:**

Amla helps in regulating blood sugar levels, making it beneficial for individuals with diabetes. It is a natural therapy to treat and control diabetes. Quercetin constituent in amla shows significant anti-diabetic activity.

9. **Anti-cancer Activity:**

Some studies suggest that Amla may have anti-cancer properties, inhibiting the growth of cancer cells and inducing apoptosis (cell death) in cancer cells. It might prevent reactive oxygen species induced DNA damage and oncogenesis due to its potent free radical scavenging activities.

10. **Anti-aging Activity:**

Amla's antioxidant properties help in slowing down the aging process by reducing oxidative stress and preventing cellular damage.

11. **Antibacterial Properties:**

Amla is rich in vitamin C and has strong antibacterial properties. This helps in reducing the bacterial load in the mouth, preventing infections, and maintaining oral hygiene.

12. **Anti-inflammatory Effects:**

The anti-inflammatory properties of amla can help reduce gum inflammation and treat conditions like gingivitis and periodontitis.

13. **Antioxidant Benefits:**

Amla is a potent antioxidant, which helps in preventing oxidative stress in the oral cavity. This can aid in the prevention of oral cancers and other oral diseases.

14. **Strengthening Gums and Teeth:**

Regular use of amla can help in strengthening the gums and teeth. The high vitamin C content helps in collagen production, which is essential for healthy gums.

15. **Healing Properties:**

Amla promotes healing of the oral tissues. It can be used to speed up the healing process of mouth ulcers and other oral wounds.

Oral health benefits

1. **Oral ulcers :**

The tannins and phenolic compounds are having antioxidant properties. They are effective in the management of oral ulcers. Benefits in the healing of oral ulcers when used in the combination with honey.

2. **Candidiasis:**

Various studies shows the extracts have inhibitory effect on the growth of various fungus such as Trichophyton species , Candida species etc. Hence it can be used as an antifungal agent.

3. **Gingival and periodontal diseases:**

Emblica officinalis is rich in vitamin C and other phytoconstituent. Act as antioxidant antibiotic agent. Many studies shows that it has been effectively controlled the growth of plaque causing bacteria. Hence it is used as effective plaque controlling agent.

4. **Dental caries:**

Prevent the plaque accumulation and acid production and also prevent the development of dental caries.

5. Endodontic infections:

It can be utilized as an effective root canal irrigant in endodontic infections during root canal treatment.

3. CONCLUSIONS

World 80% population depends on plant-derived drugs for their primary health care. Medicinal plant constitutes the base of health care system in societies. Herbal formulations can offer effective and natural alternatives for managing dental problems. They can be used to complement traditional dental care. Amla (Indian gooseberry) and guava are both fruits known for their numerous health benefits, including their positive effects on dental health. Both amla and guava maintains healthier gums and teeth, reduce the risk of dental issues, and promote overall oral hygiene. Much of the traditional uses have been validated by research. offer natural and effective ways to maintain oral health and treat common dental issues. They offer natural and effective ways to maintain oral health and treat common dental issues. The plants has been studied in terms of pharmacological activity of its major components and the results indicate potent anti-diarrhoeal, antihypertensive, antioxidant, antimicrobial and anti-mutagenic activities. A significant work has been done on pharmacological and biological activity.

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REFERENCES

1. Saleh A Almatroodi et al. Amla (Emblica officinalis): Role In health management via controlling various biological activities. Gene reports .2020;21;100820.

2. Sumra Naseer et al . The phytochemistry and medicinal value of Psidium guajava (guava). Clinical Phytoscience 2018;4:32.
3. Varalakshmi E et al . A study to assess the effectiveness of Guava leaves mouthwash with patients with oral problem . International Journal of Engineering Research and general science. 2019;7(5);2091-2730.
4. Sara A Hassan et al. comparison of the efficacy of mouth rinses camellia sinensis extract, Guava leaves extract and sodium fluoride solution, on Streptococcus mutans and lactobacillus in children (An in vitro study). Al-Azhar Journal of dental science. 2017;20(4).
5. Saleh A Almatroodi et al. Amla (Emblica officinalis): Role In health management via controlling various biological activities. Gene reports .2020;21;100820.
6. K. Ravi et al. Psidium guajava: A review on its potential as an adjunct in treating periodontal disease. Pharmacogn Rev. 2014;8(16):96-100.
7. Nisha et al. Psidium Guajava: Quercetin use in the treatment of Periodontitis.YMER.2022;21(8):0044-0477.
8. Manoj kumar et al. Guava leaves:Nutritional Composition, Phytochemical Profile and Health-Promoting Bioactivities. MDPI. ;10(4):2304-8158.
9. Shirur Dakappa et al. A review on the medicinal plant Psidium Guajava Linn.(MYRTACEAE).Journal of drug delivery and therapeutics 2013;3(2):162-168.
10. Desri Ayu Lestari. The potency of Guava leaf extract (Psidium guajava L.) as a cosmetic Formulation: A narrative Literature review.Archives of the medicine and case reports. 2022;3(3);2747-2051.
11. Chaitali mirajkar et al. Oral benefits of Phyllanthus Emblica. Middle east research journal of dentistry. 2021;1(1):23-26.
12. Kumar A et al . Essentials perspectives for Emblica officinalis. Internationaljournal of pharmaceutical and chemical sciences.2012;1(1):11-18.
13. Baliga M.S et al. Amla a wonder berry in the treatment and prevention of cancer. European Journal of Cancer Prevention.2011;20(3):225-239.
14. Aradhana Mishra et al. Multiple benefits of Amla in our day-to-day life. International journal of pharmacognosy and life sciences.2023;4(2):60-68.
15. Jain PK et al. Traditional Indian herb Emblica officinalis and its medicinal importance. Innov J Ayurvedic Sci.2016;4(4):1-15.