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# A Review On Formulation and Evaluation of Herbal Tooth Powder

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**Abstract:** *Oral hygiene is one of the most important aspects of maintaining general health and wellbeing. Healthy teeth and gums not only allow proper mastication and digestion of food but also contribute to aesthetics and self-confidence. Over the years, the rising incidence of dental caries, periodontal diseases, and tooth discoloration has generated a strong demand for effective and safe oral care products. Conventional synthetic tooth-cleaning formulations, such as chemical-based whitening pastes and gels, are widely available. However, many of these products rely on abrasive or peroxide-based agents that may lead to side effects, including tooth sensitivity, enamel erosion, and irritation of the oral mucosa. This situation has prompted an increasing preference for herbal and natural oral care alternatives, which are considered safer, eco-friendly, and rich in bioactive compounds with multiple therapeutic benefits.*

*Among the many medicinal plants employed in oral care, guava (Psidium guajava) leaves stand out due to their antimicrobial, antioxidant, anti-inflammatory, and astringent properties. Traditionally, guava leaves have been used in folk medicine for treating wounds, gastrointestinal disorders, infections, and skin diseases. In recent decades, modern pharmacological research has validated many of these traditional claims and highlighted the remarkable potential of guava leaf extracts in oral hygiene applications. Building on this knowledge, the present study focuses on the preparation and evaluation of a guava leaf-based gel intended for stain removal and oral health improvement.*

**Keywords**: Herbal tooth powder, Guava leaves, oral health, dental cleanliness

## I. INTRODUCTION

Tooth discoloration is a prevalent aesthetic issue resulting from dietary choices, smoking, inadequate oral hygiene, and the buildup of plaque. The use of synthetic whitening agents, such as hydrogen peroxide and abrasives, may lead to adverse effects including enamel erosion and irritation of the oral mucosa. In contrast, herbal remedies present safer alternatives. Guava leaf (Psidium guajava) is abundant in flavonoids, tannins, and essential oils, demonstrating significant antibacterial and antioxidant properties, particularly effective against oral pathogens. This study aims to formulate a gel-based product utilizing guava leaf powder to enhance stain removal and improve oral hygiene.

### 1. Classification of Teeth

Humans have two sets of teeth in a lifetime:

**A) Primary (Deciduous) Teeth:** 20 teeth, appear in infancy.

**B) Permanent (Adult) Teeth:** 32 teeth, replace primary teeth and include third molars (wisdom teeth).

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●**Types of Teeth**:

| Type | Function | Number (per quadrant in adults) |
|---|---|---|
| | | |
| Incisors | Cutting/Shearing food | 2 |
| Canines | Tearing food | 1 |
| Premolars | Crushing/Grinding food | 2 |
| Molars | Grinding food | 3 (including wisdom tooth) |
| | | |

**2. General Structure of a Tooth**

Each tooth has two main parts:

**A. Crown**

- The visible part above the gum line.
- Covered by enamel, the hardest tissue in the human body.
- Shape depends on the function (incisors are sharp, molars are broad)

**B. Root**

- The part embedded in the jawbone.
- Anchored by periodontal ligament.
- Covered by cementum

**C. Neck (Cervical Region)**

- Junction between crown and root.
- Surrounded by the gingiva (gums).

**3. Internal Anatomy**

- **Pulp Chamber:** The central space in the crown containing pulp tissue.
- **Root Canal:** Narrow extension of pulp in the root; communicates with pulp chamber.
- **Apex (Tip of Root):** Contains an opening (apical foramen) for nerves and blood vessels.

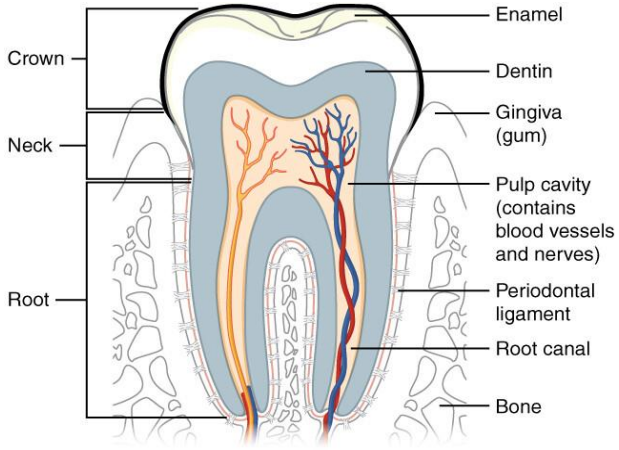


FIG.1 ANATOMY OF TEETH

**ADVANTAGE OF HERBAL TOOTH POWDER**

1. Natural and Safe
2. Antimicrobial Action
3. Anti-inflammatory and Antioxidant Effects
4. Astringent Properties

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5. Cost-Effective
6. Eco-friendly
7. Multiple Benefits
8. No Fluoride Risks
9. Customizable Formulation

**Ingredients**

**1) GUAVA LEAVE**

**Scientific Name**: *Psidium guajava L.*

**Family:** Myrtaceae

**Odor:** Characteristic aromatic.

**Taste:** Astringent and slightly bitter.

**Geographical Source**

Widely cultivated in India, Southeast Asia, Africa, and the Caribbean

FIG.2 Guava leave

**Mechanism**

**Inhibition of bacterial adhesion**

Flavonoids like guaijaverin prevent bacteria from sticking to teeth surfaces, reducing plaque formation.

**Disruption of bacterial cell walls and membranes**

Tannins and phenolics damage microbial cell walls, leading to leakage of cell contents and bacterial death.

**Enzyme inhibition:**

Essential oils and phenolic compounds inhibit microbial enzymes required for metabolism, slowing bacterial growth.

**Reduction of biofilm formation:**

Antimicrobial compounds prevent formation of plaque biofilm, maintaining oral cleanliness.

Mouth freshening effect: Volatile oils in guava leaves reduce odor-causing bacteria.

**A. Disruption of Microbial Cell Wall and Membrane**

Compounds like tannins and flavonoids can bind to proteins in bacterial cell walls, increasing permeability.

This causes leakage of cellular contents and eventual cell lysis.

Effective against Gram-positive bacteria like Streptococcus mutans, which are major contributors to dental plaque.

**B. Inhibition of Enzyme Activity**

Flavonoids and phenolics inhibit key bacterial enzymes involved in energy production and metabolism.

For example, guaijaverin inhibits glucosyltransferase in Streptococcus mutans, preventing biofilm formation and plaque accumulation.

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**OTHER INGRIDENTS**

**2) RITHA**

**Common Names**: Ritha, Soapnut, Indian Soapberry

**Scientific Name:** *Sapindus mukorossi Gaertn.*

**Family**: Sapindaceae

**Geographical Source**

Native to India, Nepal, and Sri Lanka.

**Uses:** Used as foaming agent

Ritha in tooth powder works mainly as a natural cleanser, stain remover, antimicrobial, and gum soother.

FIG.3 RITHA

**3) LIQUORICE**

**Scientific Name:**

Glycyrrhiza glabra L.

**Family**: Fabaceae (Leguminosae)

**Geographical Source**

Native to southern Europe, Middle East, and parts of Asia.

**Uses:** Liquorice in tooth powder acts as an antimicrobial, anti-inflammatory, sweetening, and gum-protective agent.

FIG.4 LIQUORICE

**4) TULSI**

**Scientific Name:** Ocimum sanctum L.

**Family:** Lamiaceae

**Geographical Source:**

Cultivated widely across India, Southeast Asia, and tropical regions worldwide.


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**Uses :** Prevents bad breath, reduces gum infections, and protects against cavities.
Use as Freshning agent

FIG.5 TULASI

**5) BABOOL**
**Scientific Name:** Acacia nilotica
**Family:** Fabaceae (Leguminosae)
**Geographical Source** : Widely cultivated in India, Pakistan, and tropical regions of Africa.
**Role :** cleaning of teeth
**Uses:** Babool in tooth powder works as an astringent, antimicrobial, gum strengthener, and natural cleanser — promoting overall dental hygiene.

FIG.6 BABOOL

## II. CONCLUSION

The increasing demand for safe and natural oral care products highlights the significance of herbal formulations in maintaining dental hygiene. Guava leaves, enriched with flavonoids, tannins, and essential oils, exhibit strong antimicrobial, antioxidant, and astringent properties, making them highly effective in preventing plaque, reducing bacterial growth, and minimizing extrinsic tooth discoloration. When combined with other medicinal plants such as Ritha, Liquorice, Tulasi, and Babool, herbal tooth powders or gels provide synergistic effects, including antimicrobial action, anti-inflammatory benefits, tooth cleaning, and breath freshening.
Evaluation parameters demonstrate that such formulations possess acceptable sensory and physical properties while avoiding the adverse effects of synthetic whitening agents like enamel erosion or mucosal irritation. Moreover, herbal

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tooth powders are cost-effective, eco-friendly, and culturally acceptable alternatives that promote overall oral health without fluoride-associated risks.

Therefore, guava leaf-based herbal formulations can be considered promising substitutes for conventional chemical products, offering both therapeutic and preventive benefits. However, further standardized clinical trials, long-term safety evaluations, and stability studies are essential to establish their efficacy and expand their acceptance in modern dental care.

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