



## FORMULATION AND EVALUATION OF HERBAL MOUTHWASH TABLET FOR ORAL INFECTION

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### ABSTRACT

**Goal:** Create and assess a herbal mouthwash pill to treat oral infections.

**Objective:** Compared to pills, mouthwash, and other liquid formulations, herbal mouthwash tablets function more quickly and have a more focused effect. In contrast to liquid mouthwash, it is easier to use. choosing an appropriate drug to make a herbal mouthwash pill that can be used to treat an oral infection.

The major goal of this study was to create and assess a herbal mouthwash pill to treat oral infection using powdered *Psidium guajava* leaves, clove, and fennel. In almost every nation, indigenous communities' cultures and conceptions of health heavily rely on traditional medical study.

Rheumatism, diarrhoea, diabetes mellitus, wounds, sore throats, and coughs are all conditions that guava leaves are frequently used to cure.

**KEYWORDS:** Guava, formulation and evaluation, Quality control parameters, Evaluation

### INTRODUCTION

#### Mouth Ulcer: <sup>[1]</sup>

“Mouth ulcer is loss or erosion of delicate lining tissue of the mouth (mucosal lining)”

Based on the length, mouth ulcers can be categorised as

- A) Acute (short-term)
- B) Chronic (prolonged)
- C) Combination

Mouth ulcer triggers include accidental bites, hard brushing, minor mouth injuries from dental work, and sports injuries.

- Mouthwashes and toothpastes with sodium lauryl sulphate in them.
- Lack of key vitamins, food sensitivities to acidic foods like strawberries, citrus, and pineapples, as well as other trigger foods like chocolate and coffee <sup>[2]</sup>.

#### Periodontal Disease <sup>[3]</sup>

The main causes of periodontal disease are infections and inflammation of the bone and gums that support and surround the teeth. When gingivitis occurs in its early stages, the gums may swell, get red, and even bleed. Periodontitis, its more severe variant, can cause bone loss, gum tissue separation from the tooth, and eventual tooth loss. Most cases of periodontal disease occur in adulthood. The two main dangers to dental health are periodontal disease and tooth decay.



### **White Sponge Nevus<sup>[4]</sup>**

colored sponge a disorder known as nevus is characterised by the development of white tissue patches termed nevi (plural: nevus), which resemble thicker, velvety, sponge-like tissue. The oral mucosa, particularly the buccal mucosa on the inside of the cheeks, is where nevi are most frequently found.

### **Guava leaves<sup>[5]</sup>**

The guava (*Psidium guajava* L.) tree, belonging to the Myrtaceae family, is a very unique and traditional plant which is grown due to its diverse medicinal and nutritive properties. Guava leaves, combined with the pulp and seeds, are used to treat several gastrointestinal and respiratory conditions as well as to boost platelets in dengue fever patients. The antispasmodic, cough sedative, anti-inflammatory, anti-diarrheic, anti-hypertension, anti-obesity, and antidiabetic effects of GLs are also commonly utilized. The effectiveness of GL isolates as powerful antitumor, anticancer, and cytotoxic drugs has also been demonstrated in studies using animal models.

### **Chemical Structure**

Guava leaves (GLs) are a great source of several macro- and micronutrients that are good for your health, as well as bioactive substances. They have 1717 mg gallic acid equivalents (GAE)/g total phenolic compounds, 103 mg ascorbic acid, 3.64% ash, 0.62% fat, 18.53% protein, and a moisture content of 82.47%.

### **Why Do Guava Leaves Work So Well for Mouth Illness?<sup>[6]</sup>**

Vitamin B and C, magnesium, manganese, potassium, iron, lycopene, quercetin, and other elements found in guava leaves can help prevent or lessen toothaches. Guava leaves are a treatment for oral infections because of the various tasks that these nutrients carry out. Guava leaves contain certain qualities that can be used to treat toothache reasons and keep us from seeing the dentist.

- Anti-inflammatory
- Analgesic
- Anti-Microbe
- Accessibility
- Provision of Minerals

### **For periodontal disease, use guava leaf<sup>[7]</sup>.**

The primary cause of periodontal disease is dental plaque. If plaque is allowed to build up without treatment or oral hygiene practises, gingivitis develops, which then develops into periodontitis. To prevent and control periodontal disease, effective plaque control measures that stop or restrict bacterial adhesion and further growth on the tooth surface are crucial. In the past, people have utilised the sensitive guava leaf paste to keep their mouths clean. Gram-positive and Gram-negative bacteria are both susceptible to the antibacterial effects of guava. Guaijaverin and quercetin, two flavonoids, are principally responsible for the guava's antibacterial properties. The tannins in the bark have given the bark antimicrobial characteristics.

### **Clove<sup>[8]</sup>**

Cloves are the dried flower buds of *Eugenia caryophyllus*, a member of the Myrtaceae family.

Phenolic substances such as flavonoids, hydroxybenzoic acids, hydroxycinnamic acids, hydroxyphenylpropens, eugenol, phenolic acids, and gallic acid are chemical constituents. Clove essential oil also contains smaller amounts of the following volatile substances: -pinene, limonene, farnesol, benzaldehyde, 2-heptanone, and ethyl hexanoate.

Uses: Carminative, aromatic, antiseptic, stimulating, and as a flavouring ingredient.

### **Fennel**

Fennels are a medicinal member of the Umbelliferous (Apiaceae) family, *Foeniculum vulgare*. Anethole, Fenchone, Anisole, and Estragol are its chemical components.

Uses: cytoprotective, hepatoprotective, antitumor, antibacterial, antifungal, antioxidant, hypoglycemic, and oestrogenic.



### Herbal mouthwash tablet<sup>[9]</sup>

Natural mouthwash pills are liquid-free oral care tablets that dissolve in water to produce a mouthwash solution that is simple to use. The bulky liquid mouthwash and its plastic containers were one of the reasons why mouthwash tablets were developed. It is applicable in the following scenarios:

1. Halitosis
2. Periodontal diseases
3. Mucositis
4. Gum illness
5. Hypertonia
6. To disinfect septic sockets
7. Vincent's angina
8. To prevent plaque.
9. To properly provide fluoride to prevent dental cavities.
10. To reduce discomfort.
11. Decrease irritation.

### Rational

The goal of creating this type of formulation is to promote herbal pharmaceutical that have fewer side effects and provide selective site effects when it comes to human health.

Herbal medicines, derived from botanical sources, have been applied in oral infection for a long history to inhibit microorganisms, reduce inflammation, and soothe irritation, Relieve pain.

Herbal mouthwash tablets are liquid-free oral care tablets that dissolve into water, creating an easy-to-use mouthwash formula. Mouthwash tablets were made, in part, to help do away with the unnecessary bulk of liquid mouthwash and its plastic containers. When dissolved in water producer a solution which makes it uniquely desirable for use a mouthwash.

It is natural alternative free of toxic ingredient, on simply taking for a lightweight travel friendly.

Mouthwash tablet offer a great solution.

The mouthwash tablet is simple to use.

## MATERIALS AND METHODS

### Preformulation Study<sup>[10,11]</sup>

**Organoleptic evaluation:** Colour and scent were noted as organoleptic characteristics

**Angle of repose:** The angle of repose was calculated using the fixed height method to estimate the flow characteristics of the polyherbal extract powder in the formulation. Over the plain, flat surface, a glass funnel with a bottom diameter of 10 mm was mounted at a height of 2 cm.

A sample of about 10 gm was fed down the funnel until the tip of the pile formed and touched the bottom. The radius of the powder cone was measured after a crude circle was drawn around the pile's base. was determined using the typical radius. The following formula can be used to determine the angle of repose:

$$\tan \theta = \frac{h}{r}$$

**Bulk density:** By carefully pouring 25 gm. of the sample combination through a glass funnel into a 100 ml graduated cylinder, we were able to calculate the bulk densities (BD) of the created polyherbal powder mixture. The initial volumes that the sample occupied were noted

$$\text{Bulk density} = \frac{\text{weight of granules}}{\text{volume of packing}}$$

**Tap density:** By carefully pouring 25 gm of the sample combination through a glass funnel into a 100 m graduated cylinder, we were able to calculate the tapped densities (TD) of the manufactured polyherbal powder mixture. To obtain a constant



volume, the cylinder was tapped from a height of 2 inches, and the average value of all formulations was then recorded. After tapping, the sample's final volume was measured, and the tapped density was determined

$$\text{Tap density} = \frac{\text{weight of granule}}{\text{tapped volume}}$$

**Carr's index:** An effective empirical guide is provided by Carr's compressibility. By comparing the bulk density and tapped density, it was possible to determine the compressibility of the polyherbal powder mixture.

$$\% \text{ Carr's index} = \frac{\text{tapped density} - \text{bulk density}}{\text{tapped density}} * 100$$

**Hausner's ratio:** It also illustrates the densification of the herbal powder mixture brought on by feed hopper vibration.

$$\text{Hausner's ratio} = \frac{\text{tapped density}}{\text{bulk density}}$$

**Table 1: Tablet composition**

Sr.no.	Ingredient	Quantity required
1	Guava Powder	250 mg
2	Clove Powder	160 mg
3	Fennel Powder	35 mg
4	Crosspovidone	20mg
5	Talc	5mg
6	Magnesium stearate	5mg
7	Starch paste	5%

### Preparation of Tablets

Weigh 5g of starch. In a beaker, mix the weighed amount of starch powder with 100 ml of water. Separate the mixture into two equal halves. Until it reaches 50% volume, heat one half. Add the other divided volume to the 50% capacity already mentioned. The 5% starch paste needed to bind the punch is ready

Mix all the ingredients and crush it in mortar pestle to obtain fine powder. Add the starch paste solution steadily until a dough state is reached to the weight API for the tablet. Pass the dough through sieve number 10 to obtain powder granules. The granules are dried in a hot air oven or outside until they are completely dry. Pass the sieve number 40's dried granules through. There are obtained fine particles. Punching tablets is done.

### Microbial Assay

#### Cup-Plate Method

Prepare a nutrient agar plate with the test organism inoculation at a depth of 4-5 mm, then let it firm. The nutritional agar plate should be divided into four equal pieces. Then create four cavities, one in each part, using a sterile borer. Then put antibiotic solution in three cavities and regular solution in one. For 24 hours, slowly incubate the plates at 37°C. Measure the zone of inhibition after incubation.

#### QC Tests for Tablets

**Hardness:** The hardness of the tablet was assessed using a Monsanto hardness tester. A compressible spring is held between two plungers in a barrel that serves as the tester's main component. A zero reading was obtained by inserting the tablet into the bottom plunger. By rotating a threaded bolt until the tablet breaks, the higher plunger was pressed up against a spring. A pointer and a gauge were placed in the barrel to measure the force as the spring compressed. The zero-force data was subtracted from the fracture force before being reported. 10 formulation tablets are examined.



**Friability:** The friability of the tablets was assessed using the Roche friabilator. Twenty previously weighed tablets were put in the friabilator, and it was turned on for 100 revolutions. After that, the tablets were powdered and weighed again.

$$\text{Friability} = \frac{W_1 - W_2}{W_1} * 100$$

**Weight variations:** Twenty tablets were chosen at random. The average weight of the tablets was estimated after they were weighed. After that, percent deviation was calculated.

**Disintegration test:** To find the disintegration time, 6 polyherbal dispersible tablets from each formulation were chosen at random. The disintegration media was an acidic buffer (pH 1.2), and the temperature was held constant at 37 0.5 °C, which is the average body temperature. Six tablets' disintegration times were recorded, and the average disintegration time was determined.

## RESULT AND DISCUSSION

### Preformulation Studies

Sr. no.	Parameter	Observation
1.	Organoleptic characteristics	
	i. Colour	Light brown
	ii. Odour	Aromatic
	iii. Taste	Aromatic
2.	Angle of repose	Passable
3.	Bulk density	0.5 gm/ml
4.	Tapped density	0.65 gm/ml
5.	Compressibility	18.46
6.	Hausner's ratio	0.80

### Evaluation of tablets

Sr. no.	parameter	Observation
1	Microbial assay	ZOI=2cm
2	Hardness	3.9 kg/cm <sup>2</sup>
3	Friability	0.4%
4	Weight Variation	pass
5	Disintegration time	1 minute

## CONCLUSION

Natural cure is mono widely accepted because they are believed to be safer and have fewer adverse effects than synthetic drug. Herbal formulations are becoming increasingly popular on the global market. The herbal mouthwash tablet of guava leaf powder, clove, and fennel powder is a really excellent try. According to the findings of this investigation. The herbal mouthwash tablet formulation has substantial therapeutic efficacy and is a suitable vehicle for drug administration at a cheap cost yet with high potency.



The findings revealed that a novel herbal mouthwash tablet produced using a combined close form had strong antibacterial, anti-inflammatory action. Making it safe and effective for the treatment of oral infection such as mouth ulcer, periodontal disease and white sponge nerves disease

The study concluded with the invention of a herbal mouthwash tablet that is a effective in treatment of oral infection and the distinct characteristics of guava leaf, clove powder and fennel powder were found to be highly beneficial in the treatment of oral infection.

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