

Formulation & Evaluation of Herbal based Mouthwash Effective against Common oral Bactria

Miss. Vaishanvi Vilas Jadhav^{1*}, Waghmare S. U², Mr. Kishan A. Kukar¹, Mr. Abhishek T. Walunje¹

¹UG Scholar of Rashtriya College of Pharmacy Hatnoor, Tq. Kannad Dist. Chh. Sambhajinagar, Maharashtra, India -431103

²Assistant Professor of Rashtriya College of Pharmacy Hatnoor, Tq. Kannad Dist. Chh. Sambhajinagar, Maharashtra, India -431103

DOI: [10.36348/sjbr.2024.v09i04.002](https://doi.org/10.36348/sjbr.2024.v09i04.002)

Received: 10.05.2024 | Accepted: 21.06.2024 | Published: 28.06.2024

*Corresponding author: Miss. Vaishanvi Vilas Jadhav

UG Scholar of Rashtriya College of Pharmacy Hatnoor, Tq. Kannad Dist. Chh. Sambhajinagar, Maharashtra, India -431103

Abstract

In many places around the world, indigenous communities use traditional medicine as a big part of their culture and understanding of health. Guava leaves have been traditionally used to treat various illnesses like rheumatism, diarrhea, diabetes, and cough. This study looks at how guava leaves can fight fungi and bacteria. Making a herbal mouthwash with guava leaves could be a good idea for keeping our mouths clean. To make the mouthwash, we boil guava leaves to get the helpful compounds. We can also add other herbs like mint to make it even better at killing germs. After brushing your teeth, you can use this mouthwash twice a day for about 30 seconds each time to keep your mouth healthy and fight off common mouth bacteria. Herbal mouthwash is made from plant extracts instead of chemicals. It's better because it doesn't irritate or stain, and it doesn't have alcohol [1]. Guava leaves have many helpful compounds that fight bacteria, like Flavonoids, Eugenol, Terpenoids, and Linalool. These compounds help make guava leaves a good choice for a mouthwash. Making this herbal mouthwash involves a lot of steps: researching, understanding, developing, extracting, testing, refining, consulting experts, packaging, and storing.

Keywords: Guava leaves, Mouthwash, mint leaves, Benzoic acid.

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Guava, also known as *Psidium guajava*, is packed with important nutrients. Originally from South Africa, it was brought to India by the Portuguese. Guava leaves are commonly used in Asian countries and are prized in Western countries for their medicinal benefits. Guava trees are small in size. Guava belongs to the Myrtaceae family and thrives in tropical or subtropical climates. India is the top guava producer, followed by China. Guava leaves are typically 3 to 4 inches long [2].

Almost every part of the guava plant has medicinal qualities, making it popular in the Philippines and approved by the Department of Health as a medicinal plant. Guava is a small tree that can reach up to 3 meters in height. Its fruit, bark, and leaves are used for herbal medicine. A decoction of guava leaves is known for treating chronic diarrhea and gastroenteritis. It's also used to clean wounds and for vaginal and uterine issues. Guava leaf decoction can be used as a mouthwash too. Guava has been used to manage toothaches, sore throats, and inflamed gums [3].



Figure 1: Common Name:- Guava Leaves; Scientific Name:-*Psidium guajava*; Family Name:- Myrtaceae

Biological Source:-

Guava leaves come from the guava tree, scientifically known as *Psidium guajava*. This evergreen tree is native to Central America but is now cultivated in many tropical and subtropical regions worldwide. The leaves of this tree are used for various traditional medicinal and herbal purposes.

Cultivation and Collection:-

India has lots of different climates that are good for growing lots of different fruits. Right now, India is the second biggest producer of fruits in the world, after China [4]. We need a way to grow enough food that's good for us and won't harm the environment. Guava is a really important fruit in India, but the usual way of growing it can spread a tiny worm that hurts guava trees. Guava, also called the "Apple of the tropics," is a very common and well-liked fruit in warm areas of India [5].

Soil and Climate

Guava can grow in different kinds of soil, like heavy clay or light sandy soil, but it prefers sandy loam soil best with a pH of 5 to 7. It can be grown in any type of farming system and does well in different kinds of hilly areas.

Varieties:-

For the NEH region, good guava types include Allahabad Safeda and Lucknow-49. There are also other varieties like RCG-11, RCGH-1, RCGH-4, and RCGH-7 developed specifically for this area.

Propagation:-

Guava plants can be grown from seeds or other plant parts, but most farmers prefer using other plant parts because it's easier and more reliable [6].

- 1) **Raising of rootstock**
- 2) **Grafting**
- 3) **Patch budding**
- 4) **Preparation of land and pits**
- 5) **Planting**
- 6) **Training and pruning**
- 7) **Intercropping**
- 8) **Raising of rootstock:**

To grow strong guava plants, you start by getting seeds from ripe guava fruits. Then, clean the seeds with water. To help them grow better, you can soak them in a mix of GA3 and water for 12 hours or just in water for 24 hours. Plant the seeds in a nursery bed around February. Put some dry grass on top of the bed and water lightly. When the seedlings are 8 to 10 cm tall, move them into small plastic bags. These seedlings are ready for grafting in 8 to 12 months or budding in 12 to 18 months

1) Grafting -

In February to March, a common way to grow many guava plants is by wedge grafting. First, the bottom part of the plant is cut about 15 cm above the ground. Then, the top part is cut into a wedge shape. Next, a cut is made in the middle of the bottom part, and the wedge-shaped top part is put into it. They're tied together with a plastic strip. A small plastic cap is put over the graft. After about 12 to 15 days, you can see new growth. After 25 to 30 days, the cap is removed.



Figure 2: Propagation in Guava

Patch budding:-

Patch budding is when you take off a piece of bark from a tree and replace it with a new piece

containing a bud. This method works well for growing guava trees. It's best to use rootstocks that are about one

and a half to two years old. The ideal time to do patch budding is in February or March

2) Preparation of land and pits

First, we draw lines on the land to follow its shape. Then, we make half-circle terraces that are one meter in diameter. On these terraces, we dig pits that are about 0.75 meters wide, 0.75 meters long, and 0.75 meters deep, spaced 5 meters apart. After digging, we fill the pits with soil mixed with some nutrients like organic fertilizer, urea, MOP, SSP, and Chlorpyrifos. We make sure to fill the pits about 15sec

3) Planting

The ideal time to plant guava is between June and August. If there's no rain after planting, we give the plants a little water to help them grow centimeters above the ground level.

4) Training and pruning

In the beginning, we let the trees grow up straight until they reach about 70 to 80 centimeters tall. Then, we cut the tops off to encourage new growth below the cut. We keep three to four shoots evenly spaced

around the stem to become the main branches of the tree. These branches are allowed to grow to about 40 to 50 centimeters. We trim them back by half to make more shoots grow. After another three to four months, we trim them again by half to help the tree produce fruit. Any shoots growing from the ground or below where the graft was made, as well as any dried twigs, should be removed regularly.

5) Inercropping:

You can make extra money by planting other crops like ginger, turmeric, chili, french beans, rice beans, and other veggies in your guava orchard before the guava trees start bearing fruits

6) Manure and Fertilizer Schedule:

We put farmyard manure (FYM) on the soil from February to March. Then, we split the fertilizer into two parts, giving half in April and the other half in September. We apply the fertilizers in a circle about 20 to 25 centimeters wide and 10 to 15 centimeters deep around the area under the tree's branches, keeping about 15 to 20 centimeters away from the main trunk.



Fig. 1. Fourth mature guava leaves from shoot tip planted in protrays and kept under polytunnel.



Fig. 2. Change of leaf midrib and vein colour to yellow after 15 days of planting.



Fig. 3. Rooting of leaf propagated guava plants



Fig. 4. Well-developed plants from leaves in guava cv. Lucknow 49

Figure 3

Chart No 1

Tree (Year)	Quantity/plant			
	FYM (kg)	Urea(g)	SSP(g)	MOP(g)
1.	5	285	250	185
2.	10	400	500	370
3.	15	860	750	300
4.	20	1140	400	400
5 and above	25	1430	500	500

From what they found out, dipping the fourth big leaves from the top of the plant in a certain liquid for 2 minutes made them grow roots better. Another liquid made the leaves grow shoots better when dipped for 1 minute. The best rooting happened with the first liquid, and the best survival rate with the second one. They say if you control the temperature, humidity, and water well, this method can give you good plants easily. Compared to other ways, this method is easier, needs less work, makes the plants grow quickly, and doesn't attract harmful worms. It's also cheaper and gives fruits early, staying true to the original type of plant.

FUTURE SCOPE

More research can be done on using different plant growth helpers and soils to make this method even better. It's important to compare it with other ways of growing plants too. Trying it out in real fields will help us understand if it's good for making lots of high-quality plants for sale [7].

Species:-

- Psidium amplexicaule
- Psidium araa
- Psidium araca
- Psidium australe
- Psidium cattleianum
- Cattley Guava, Peruvian Guava, "arazá" (Colombia), "Chinese Guava" (as invasive species)

Uses:-

Guava leaves have been used for a long time for their health benefits. People use them in different ways:

- 1) **Herbal Remedies:** Guava leaves are used in natural remedies because they might help fight bacteria, reduce inflammation, and act as antioxidants.
- 2) **Oral Health:** Some mouthwashes and dental products use guava leaf extracts because they could help keep your mouth clean.
- 3) **Skin Care:** Skincare products sometimes include guava leaf extracts because they might make your skin healthier, especially for treating acne and wounds.

- 4) **Antioxidant Benefits:** Guava leaves contain substances like flavonoids and carotenoids, which are good at fighting harmful molecules in your body that can cause damage.
- 5) **Digestive Health:** Guava leaf infusions are sometimes consumed for digestive support and to alleviate gastrointestinal issues [8].

Uses of mouth wash

Gum disease Mouthwash is good for some things, but you shouldn't rely on it alone to keep your mouth clean. It's helpful for bad breath, sore mouth, gum disease, dry mouth, and preventing tooth decay. You can also use it to clean wounds in your mouth, control plaque, relieve pain, deliver fluoride to prevent cavities, and reduce swelling. But remember, it's important to still brush and floss regularly for the health of your teeth and gums.

- Xerostomia
- To clean septic socket
- Vincent angina
- To control plaque
- To relieve pain
- To effectively deliver fluoride in order to prevent dental carries

Benefit of natural mouth wash:-

Reduce inflammation

Some natural mouthwashes are available in stores. They use things like tea tree oil, Echinacea, mint, and cinnamon to fight bad bacteria and keep your mouth fresh. These natural mouthwashes usually don't have alcohol, sugar, artificial colors, sweeteners like saccharine, processed fluoride that can stain teeth, CPC, SLS, or harsh chemical preservatives and dyes [9].

In India, people use guava leaves to make tea that helps reduce fever, muscle spasms, and rheumatism. In the USA, they use the leaves as an antibiotic by making a poultice or tea for wounds, ulcers, and toothaches. Guava tea can also help with bronchitis, asthma, coughs, and lung problems [10].

Check out these 5 benefits that mouthwash brings to your hygiene routine

- 1) Help to prevent cavities
- 2) Help to freshen breath
- 3) Can make breath feel better
- 4) Can help to reduce plaque
- 5) Can kill bacteria and help to clear excess

particies

prevent dental carries

Uses of mouth wash

Gum disease Mouthwash is good for some things, but you shouldn't rely on it alone to keep your mouth clean. It's helpful for bad breath, sore mouth, gum disease, dry mouth, and preventing tooth decay. You can also use it to clean wounds in your mouth, control plaque, relieve pain, deliver fluoride to prevent cavities, and reduce swelling. But remember, it's important to still brush and floss regularly for the health of your teeth and gums.

- Xerostomia
- To clean septic socket
- Vincent angina
- To control plaque
- To relieve pain
- To effectively deliver fluoride in order to

**Benefit of natural mouth wash:-
Reduce inflammatio**

Some natural mouthwashes are available in stores. They use things like tea tree oil, Echinacea, mint, and cinnamon to fight bad bacteria and keep your mouth fresh. These natural mouthwashes usually don't have alcohol, sugar, artificial colors, sweeteners like saccharine, processed fluoride that can stain teeth, CPC, SLS, or harsh chemical preservatives and dyes [9].

In India, people use guava leaves to make tea that helps reduce fever, muscle spasms, and rheumatism. In the USA, they use the leaves as an antibiotic by making a poultice or tea for wounds, ulcers, and toothaches. Guava tea can also help with bronchitis, asthma, coughs, and lung problems [10].

Check out these 5 benefits that mouthwash brings to your hygiene routine.

- 1) Helps to Prevent cavities
- 2) Helps to freshen breath better
- 3) can make canker sores feel
- 4) Can help to reduce plaque
- 5) Can kill bactria and help to clear excess particies

Chart No 2

Botanical classification	
Kingdom	Plantae - Plants
Subkingdom	Tracheobionta Vascular plants
Superdivision	Spermatophyta Seed plants
Division	Magnoliophyta Flower plants
Class	Magnoliopsida Dicotyledonous
Subclass	Rosidae
Order	Myrtales
Family	Myrtaceae
Subfamily	Myrtoideae
Tribe	Myrteae
Gender	Psidium
Species	Psidium guajava

HERBAL MOUTHWASH:

Toothpaste and toothpowder are for cleaning your mouth, while mouthwash freshens and disinfects.

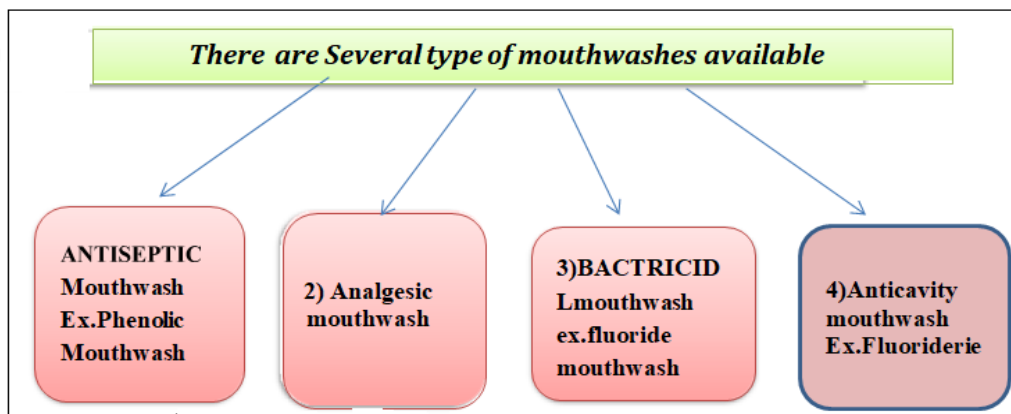
Mouthwash also helps remove bits of food or other stuff from your mouth and between your teeth.

A good mouthwash should have following characters:-

- Good and quick antiseptic action at the dilution it is used.
- Attractive flavor to impart a odour to the mouth.
- Sweet taste.
- Not much expensive.
- Non-irritant to mouth and mucous membrane.
- Non toxic [11]



Figure 3



Common over-the-counter (OTC) medicines and products that people often use for oral mouth problems include:

- Amoxicillin (drug of choice for mouth infection)
- Azithromycin
- Cefoxitin
- Metronidazole
- Penicillin

Some other therapies for mouth infection include:

Here's a simplified version:

- Use creams for two weeks to treat simple mouth fungus (thrush).
- If you can't use creams or have a weak immune system, take pills instead.
- Use medicine for viruses if you have sores from viruses.
- Some over-the-counter mouthwashes can help prevent mouth infections, like Chlorhexidine gluconate, Peridex, Periogard, Paroex, and Perisol [12].

India, the regulatory framework for cosmetics primarily falls under the Drugs and Cosmetics Act, 1940 and the Drugs and Cosmetics Rules, 1945. These regulations oversee the import, manufacture, distribution, and sale of cosmetics

1) Drugs and Cosmetics Act, 1940:

This law covers cosmetics, defining them and setting standards for their ingredients, labeling, packaging, and how they're made, distributed, and sold.

2) Drugs and Cosmetics Rules, 1945:-

These rules give detailed guidelines for making, selling, and labeling cosmetics. They include rules for licenses, packaging, testing, and importing.

3) Schedule S and Schedule Q:-

These are part of the rules and list what ingredients, labeling, and packaging cosmetics must have.

4) Bureau of Indian Standards (BIS):-

BIS sets quality and safety standards for products, including cosmetics. Manufacturers usually have to follow these standards.

5) Food Safety and Standards Act, 2006: -

This law mainly deals with food safety but also covers some aspects of cosmetics, especially if they're related to food.

6) Consumer Protection Act, 2019:-

This law protects consumers' rights and deals with issues like product quality, safety, and handling complaints. In the development and marketing of cosmetics, adherence to these legislations is essential. Manufacturers must obtain licenses and follow guidelines concerning ingredients, labeling [13].



Material

- 1) Fresh guava Leaves (20gm)
- 2) Water (250 ml)
- 3) Pot For Boiling
- 4) Stirrer
- 5) Strainer
- 6) Clean Air Tight Container for Storage
- 7) Benzoic Acide (Preservative)
- 8) Mint Leaves

Method (Extraction Method)

- 1) Leaves should be weight and wash properly
- 2) Crush the leaves (with the help of mortar pestel)
- 3) It should be boiled in sterile water for 15min by keeping it in water bath and then filter
- 4) Cool the mixture
- 5) Preservatives and other remaining excipient should be added

Chart No 3

Sr. no	Name of ingredient	Biological source	Description and uses	photo
1.	Peppermint leaves	Extracted from stem, leaves and flowering part of menthe piperita linn Family – labitae	Antiviral Bactericidal Analgesic and counter irritant in bad breath Pungent and refreshing odour of mouth	
2.	Guava leaves	Extracted from leaves of psidium guajava linn Family – myrtaceae	Anti plaque activit Mouth source Antiseptic Cure bleeding of gum Mouth ulcer	
3.	Benzoic acid		Used as preservatives	

We looked at how guava leaf extract can make antibacterial silver nanoparticles (Ag-NPs) because it has flavonoids. To do this, we studied the guava leaf extract and what's in it, like its main parts and how well they dissolve in water [15].

Ethnomedicine is about studying traditional ways of healing, which are really important in many cultures around the world. For example, Indian Ayurveda and traditional Chinese medicine are still used today. They use natural remedies to keep people healthy and improve their lives. One way they do this is by using plants as medicine. Guava, a small tree found in tropical areas, is one of these plants. People have used guava

leaves for a long time, especially to treat diarrhea. There are many other traditional uses of guava leaves in different parts of the world, except Europe.

Ethnomedicine is all about learning how different cultures heal using traditional methods. For instance, Indian Ayurveda and traditional Chinese medicine are still popular today. They rely on natural remedies, often made from plants, to keep people healthy and make their lives better. Guava, a small tropical tree, is one such plant used in this way. People have been using guava leaves for a while, particularly to treat diarrhea. In various parts of the world, people have found other uses for guava leaves too, although not in Europe.



Figure 4: Main traditional uses of guava leaves in the principal producer countries [16]

Currently, there is increasing interest in studying of plants regarding their chemical components of bioactive compounds, their effects on several diseases, and their use for human health as functional foods and/or nutraceuticals. In recent years, guava leaves mouth wash and some complementary guava products are available in several shops in India and Japan as well as on the Internet, (Gumex-s, Amfor, Jeju Guava Leaf) because guava leaf phenolic compounds have been claimed to be food for specified health use (FOSHU), since they have beneficial health effects related to the modulation of blood-sugar level.

Chemical Structure:

Guava leaves are packed with lots of good stuff for your health, like vitamins and other important nutrients. They have plenty of gallic acid and phenolic compounds, which are good for you. Plus, they contain ascorbic acid, ash, fat, protein, and moisture. Guava leaves, along with the fruit and seeds, are used to help with stomach and breathing problems, and they can also boost platelets in people with dengue fever. They have many health benefits like calming spasms, soothing coughs, reducing inflammation, easing diarrhea, lowering blood pressure, fighting obesity, and managing diabetes. Some studies suggest they might even help

fight cancer in animals. Guava leaves have vitamins B and C, along with minerals like magnesium, manganese, potassium, and iron, as well as lycopene and quercetin. These can help prevent or reduce toothaches and treat oral infections. They have qualities like reducing inflammation, easing pain, fighting germs, and providing essential minerals, which can help with tooth problems and save you a trip to the dentist. The main cause of gum disease is plaque on your teeth. If you don't remove plaque through brushing and flossing, it can lead to gingivitis, which can then turn into periodontitis. To prevent gum disease, it's important to control plaque buildup by stopping bacteria from sticking to your teeth. In the past, people used guava leaf paste to clean their mouths because it has antibacterial properties that can kill both types of bacteria: Gram-positive and Gram-negative. This is thanks to substances like guaijaverin and quercetin, which are found in guava leaves. Additionally, the tannins in the bark of the tree also have antimicrobial properties.

Why Do Guava Leaves Work So Well for Mouth Illness?

Guava leaves can help prevent or reduce toothaches because they contain vitamins B and C, magnesium, manganese, potassium, iron, lycopene,

quercetin, and other nutrients. These elements can treat oral infections and reduce the need for dental visits. Here are some reasons why guava leaves are helpful:

Anti-inflammatory

- They reduce swelling and inflammation.
- Analgesic
- They help relieve pain.
- Anti-microbial
- They fight germs and bacteria.
- Accessibility
- Guava leaves are easy to find.
- Provision of Minerals
- They provide important minerals for dental health.

For periodontal disease, use guava leaf:-

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.

Guajaverin and quercetin, two flavonoids, are principally responsible for the guava's antibacterial properties. The tannins in the bark have given the bark antimicrobial characteristics [17].

Phytochemical tests:-

Materials for Phytochemical Analysis

Test-tube, conical flask, spatula, weighing balance, shaker machine.

Chart No 4

Sr. No	Phytochemical Tests	Observation	Result
1.	Test for Flavonoid:- 3ml aliquot of the filtrated and 1ml of the 10% NaOH sodium hydroxide was mixed together, to find the possibility of flavonoid	Appearance yellow colour	++
2.	Test for Tannins:- In this determination, a Ferric chloride solution plus 5% ferric chloride solution will be added drop by drop, 2-3mls in the solution of leave of guava extract in order to observed the appearance of Tannins	Dark green colour solution were appeared	++
3.	Determination of Saponin:- In this test 5ml of the extract was poured in to a test tube + 5ml of water and its then shaken strongly to determine the present of saponin in the sample	Honey tomb froth in the solution	+
4.	Determination of Glycosides:- 2.5ml of 50% H ₂ SO ₄ was added to 5ml of the extract in a test tube. The mixture was heated in boiling water for 15 minutes. It was cooled and neutralized with 10% NaOH, 5ml of Fehling's solution was added and the mixture was boiled.		-
5.	Determination of Alkaloids:- About 2ml of 10% aqueous hydrochloric acid was stirred with 2ml of guava extract. 1ml was treated with a few drops of Wagners reagent and second 1ml portion was then treated similar with Mayers reagent.	Precipitate were observed	++
6.	Test for Cardiac Glycosides:- (Keller-killiani's test) A solution of herb extract with 2ml of 3.5% ferric chloride solution was added and allowed to stand for one minute. 2mls of Conc. H ₂ SO ₄ was carefully poured down the wall of the tube so as to form a lower layer		-
7.	Determination of Test for Steroids (Salwoski):- This was carried out according to the method of Harbone 1973. 2ml of the extract was dissolved in 2ml of chloroform. 2ml of sulphuric acid was carefully added to form lower layer.		++
8.	Test for Saponin Glycosides:- To 2.5ml of the extract was added 2.5ml of Fehling's solution,	Gel formation (blue colour)	++
9.	Test for Basalms:- 9.5ml of the extract was mixed with equal volume of 90% ethanol, 2 drops of alcoholic ferric chloride solution was added to the mixture.	Dark blue colour ppt	++
10.	1 Test for Anthraquinones:- 2ml of each plant extract was shaken with 10ml benzene, and 5ml of 10% ammonia solution was added. The mixture was shaken in order to obtained the coulur of antraquinonesand.		+
11.	Test for Volatile oils:- 1ml of the fraction was mixed with dilute Hcl. A white precipitate was not formed, this indicated the absence of volatile oils.		-

Note:- + represents the presents of the constituents; - represents the absent of the constituents [18]



Figure 5

Proximate Composition

Guava leaves (GLs) are a rich source 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, and 1717mg gallic acid equivalents (GAE)/g total phenolic compounds. The overall proximate profile of GLs is presented in Table.

Nutritional profile of guava leaves

Chart No 5

Compound	Content/Composition
Elements and ascorbic acid Potassium phosphorus Nitrogen Ascorbic acid	1.11% 0.23% 1.02% 142.55mg/100g
carbohydrate/ phenol/ sulfates	
fructose	1.44%
Rhamnose	3.88%
Arabinose	22.6%
Galactose	29.41%
Glucose	33.79%
Manose	0.59%
Xylose	7.71%
Phenol	15.28%
Sulfate	18.58%
Carbohydrate	48.13%
Sulfate polysaccharide	66.71%
Protein	
Association of official analytical chemists (AOAC) method	22.98 +_ 0.036% [dry weight (DW) basis]
AOAC method	9.73%
Lowrys method	16.8mg/100g

Polysaccharides

Polysaccharides are large molecules found everywhere in nature. They are made up of long chains of simple sugars called monosaccharides. Polysaccharides have many useful properties, including being antioxidants, anti-inflammatory, antidiabetic, immune-boosting, and anti-cancer.

Researchers extracted up to 0.51% guava leaf polysaccharides (GLP) using a method called UAE. These GLPs showed good antioxidant activity, scavenging 72-86% of DPPH• and 42.94-58.33% of •OH radicals. GLPs are divided into two types: unsulfated and sulfated. Sulfated GLPs have about 18.58% sulfatecontent.

Proteins:- Guava leaves contain 9.73% protein when dried. Proteins are large molecules made of amino acids and are essential for building cells. They are important for growth and maintenance, regulating enzymes, cell communication, and acting as biocatalysts.

Minerals and Vitamins:- Guava leaves are rich in minerals like calcium, potassium, sulfur, sodium, iron, boron, magnesium, and manganese, as well as vitamins C and B. The high levels of magnesium, sodium, sulfur, manganese, and boron in guava leaves make them great for human nutrition and also good as animal feed to prevent micronutrient deficiencies [19].

Eveluation Parameters

1. Colour and odour: The smell and color of the mouthwash were checked by looking at it.

2. pH: The pH of the herbal mouthwash was measured using a digital pH meter. The meter was calibrated with a standard buffer solution. Then, the mouthwash was mixed with distilled water, and its pH was measured. The pH of a mouthwash should be between 4.3 and 5.9.

3. Microbial growth test: The mouthwash was placed on an agar plate with the right media using the streak plate method, and a control plate was also prepared. The plates were incubated at 37°C for 24 hours. After incubation, the plates were checked for microbial growth by comparing them with the control.

4. Total solid content: TSC was measured using a refractometer. Three drops of each sample were used to get the Brix value with the refractometer.

5. Foaming ability: The foam test was done by beating the solution in a stationary cylinder with a perforated disk attached to a stem. The volume and stability of the foam were measured right after beating and after some time, then compared with known products. To do this, the solution was poured into a measuring cylinder carefully to avoid foaming. The plunger was moved up and down 60 times in one minute. The amount of foam in milliliters was measured immediately and at set time intervals afterward.

6. Viscosity: The viscosity was measured using a Cannon-Fenske capillary viscometer.

We determined the time "t" in second "s" for a particular volume of liquid to flow through capillary of a calibrated with computer by gravity. This all processor done at room temperature. Then the Kinetic viscosity was calculated by mean of standard equation.

Where;

$$v=k.t$$

k is constant 0.2326mm²s² t is time in seconds v is viscosity [11].

REFERENCES

1. Ujala, M., Shashikant, M., Piyush, Y., Roshanee, M., & Pragya, Y. (2021). Herbal Mouthwash. *Journal of Emerging Technologies and Innovative Research*, p. 839.
2. Arjun, K., Sushree, S. M., Indrapal, R., & Manju, H. (2018). A review on medicinal properties of Psidium. *Journal of Medicinal Plants Studies*, p. 44.
3. Guintu, J. Article in Philippine Journal of Otolaryngology Head and Neck Surgery. Ferdinand. s.l.: Reyes Memorial Medical Center, 2013.
4. Manga, B., Jhologiker, P., Swamy, G. S. K., Prabhuling, G., & Sandhyarani, N. (2017). Studies on the effect of propagation environment for softwood grafting in guava (*Psidium guajava* L.) cv. Sardar. *International Journal of Current Microbiology and Applied Sciences*, 6(6), 2779-2783.
5. Vikram, C., & Indu Rani, C. (2022). Leaf Propagation in Guava (*Psidium guajava* L.)- An Unique Approach for Producing Quality and Nematode-free Planting Materials. Coimbatore (TamilNadu): Biological Forum – An International Journal, p. 465.
6. Patel, R. K., Deshmukh, N. A., Patel, A. N., & Bidyut, C. D. Guava Package of practices. UMIAM: ICAR Research Complex for NEH Region, Umiam.
7. Vikram, C., & Indu Rani, C. (2022). Leaf Propagation in Guava (*Psidium guajava* L.)- An Unique Approach for Producing Quality and Nematode-free Planting Materials. Coimbatore: Biological Forum – An International Journal, 2022, p. 468.
8. openai. [Online] (<https://chat.openai.com/share/fa039497-99d8-4c4c-b0bf-2ada6b5caf28>).
9. Ujala, M., Shashikant, M., Piyush, Y., Roshanee, M., & Pragya, Y. (2021). Herbal Mouthwash. *Journal of Emerging Technologies and Innovative Research (JETIR)*, 8, 840-841.
10. Dakappa, S. S., Adhikari, R., Timilsina, S. S., & Sajjekhan, S. (2013). A review on the medicinal plant *Psidium guajava* Linn. (Myrtaceae). *Journal of Drug Delivery and Therapeutics*, 3(2), 163.
11. Sharma, Akash. Anti plaque semi herbal mouthwash. 2022.
12. Divya Jacob, Pallavi Suyog Uttekar. medicineNet. www.medicinenet.com. [Online] https://www.medicinenet.com/which_medicine_is_best_for_mouth_infection/article.htm.
13. openai. chat.openai.com. [Online] <https://chat.openai.com/share/fa039497-99d8-4c4c-b0bf-2ada6b5caf28>.
14. Anupama. www.bimbima.com. [Online] Dec 20, 2013. <https://www.bimbima.com/ayurveda/guava-leaf-mouthwash-benefits/1133/>.
15. Parashar, U. K., Kumar, V., Bera, T., Saxena, P. S., Nath, G., Srivastava, S. K., ... & Srivastava, A. (2011). Study of mechanism of enhanced antibacterial activity by green synthesis of silver

- nanoparticles. *Nanotechnology*, 22(41), 415104.
16. Díaz-de-Cerio, E., Verardo, V., Gómez-Caravaca, A. M., Fernández-Gutiérrez, A., & Segura-Carretero, A. (2017). Health effects of *Psidium guajava* L. leaves: an overview of the last decade. *International journal of molecular sciences*, 18(4), 897.
17. Patel Bhoomi, S., Narkhede Sachin, B., Tejal Disagar, Y. K. L., Ahir Sujal, P., Rathore Arman, A., & Prasad Rahul, R. (2023). Formulation and Evaluation of Herbal Mouthwash Tablet for Oral Infection. *EPRA International Journal of Research and Development (IJRD)*, 8(5), 345-350.
18. Adamu, A. (2021). Phytochemical screening of guava leave extract. *International Journal of Pure and Applied Science Research*, 12(2), 89-95.
19. Guava (*Psidium guajava* L.) Leaves: Nutritional Composition, Phytochemical Profile, and Health-Promoting Bioactivities. Kumar, Manoj. Mumbai: Pubmed, 2021.
20. Openai. [Online] (<https://chat.openai.com/share/fa039497-99d8-4c4c-b0bf-2ada6b5caf28>).