



“Formulation and Evaluation of Herbal Toothpaste”

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Abstract

In the current work, herbal substances that are accessible, affordable, and effective are being incorporated into personal hygiene products. Psidium Guajava, a member of the Myrtaceae (Guava) family, has several antibacterial, anti-cancer, anti-diabetic, and antioxidant properties in its leaves. Guava leaf extract has long been utilised for its therapeutic properties. The primary goal of this research is to use the herbal component to create toothpaste that can efficiently remove oral germs. We bought guava leaves at Nesari, Maharashtra. For extraction, guava leaves were first cleaned with distilled water before being sun-dried for three days. For its antibacterial activities, guava leaf extraction was done by cold maceration with 70% ethanol.

The main component of this extract was utilised to make herbal toothpaste. In a laboratory, toothpaste formulations are carried out. Numerous assessment tests, including those for pH, spreadability, foaming capacity, moisture content, and zone of inhibition, were performed on the formulation. All evaluation test results were discovered to be within the acceptable ranges. The antibacterial activity of guava leaf extract on Escherichia coli, Staphylococcus aureus, and other bacteria that depend on saponins, tannins, and flavonoids is determined by extraction against ethanol and the agar well diffusion method. However, the extract itself can be utilised to treat sore gums. The major ingredient in guava leaf extract is pentacyclic tri-terpenoid guajanoic acid.

Keywords: Gava leaves, herbal toothpaste, clove, honey, Psidium Guajava

Introduction

Cosmetics are made up of a variety of chemical substances that come from both natural and manmade sources. Cosmetics serve a variety of functions. The body or skin can be cleansed or protected using those intended for personal care and skin care. Cosmetics intended to improve one's look (makeup) can be used to hide flaws, highlight natural characteristics (such the eyebrows and eyelashes), add colour to the face, or completely alter the face's appearance to resemble another person, animal, or object. Cosmetics may be created to enhance body scent. Cosmetics are made up of a variety of chemical components that are either produced from natural sources or artificially produced ones. Cosmetics serve a variety of functions. those intended for private The body or skin can be cleansed or protected using it. cosmetics used to make one look better One can use (makeup) to cover flaws, accentuate their natural features (such their eyebrows and Eye makeup (such as eyelashes) can be used to completely alter the appearance of the face and add colour. resemble another thing, being, or item. Cosmetics may be created to enhance body scent.

Since the Sumerians and the Egyptians, cosmetics have been utilised for thousands of years. Throughout the Middle Ages, Europe continued to employ cosmetics to whiten the face and rouge the cheeks. The use of cosmetics was officially condemned at numerous occasions in Western history as attitudes regarding cosmetics changed

throughout time. Despite the shifts in social perceptions about cosmetics, many people still occasionally used cosmetics to obtain their idealised appearance.

As attitudes regarding cosmetics changed in the late 19th and early 20th centuries, the cosmetics industry expanded. In the US, the market was created in the 1910s by individuals like Elizabeth Arden, Helena Rubinstein, and Max Factor. Revlon and Estée Lauder joined these companies just before and after World War II, respectively. By the middle of the 20th century, women in almost all industrial societies used cosmetics often, and by the start of the 21st century, the cosmetics industry had grown to be a multibillion-dollar business.

Herbal cosmetics

The term "herbal formulation" refers to a dosage form that contains one or more herbs or processed herbs in specific amounts to provide specific nutritional, cosmetic, and/or other benefits intended for use in the diagnosis, treatment, or mitigation of diseases in humans or animals, as well as to change the anatomy or physiology of humans or animals. Herbal compounds are treated with procedures including extraction, distillation, expression, fractionation, purification, concentration, or fermentation to create herbal medicines. Comminuted or powdered herbal products, tinctures, extracts, essential oils, expressed juices, and processed exudates are some examples of these.

Traditional medicine and alternative medicine are both heavily reliant on herbal therapy, both in developed and developing nations. Because of the prevalent perception that medications made from plants are reliable, safe, and have fewer adverse effects. According to a study of the literature, traditional plant medicines are helpful for a number of skin-related issues as well as wound healing.

Gum and tooth issues have traditionally been treated using herbal medicines. Plastic-bristle brushes are uncommon in many traditional societies; instead, herbal "chewing sticks" are frequently used. • Usually, trees, bushes, or plants with high antibacterial content are used to make chewing sticks. Selected sticks' ends are shredded and used to "floss" the teeth and massage the gums.

Young twigs from any of a number of willows or oaks have been used as chewing sticks in California for ages and are still readily accessible. The following herbs have a long history of usage in Traditional Chinese Medicine for both prevention and helping the body cure itself from gum and tooth diseases.

The World Health Organization (WHO) and our nation both support the use of traditional medicine since it is more affordable, widely accessible, and effective, particularly in developing nations. Herbal medicine has been used for millennia and is being explored in some European and Asian nations. Great effort has been done that is beyond the comprehension and ability of the average person.

Objective

- Communication under uncertainty
- clinical, toxicological, and pharmacological records.
- Analysing "drug" interactions is necessary to comprehend how dangerous additives are added and why they are effective.
- Evaluation of efficacy and safety

ADVANTAGES OF HERBAL FORMULATION OVER SYNTHETIC :

1 The most recent fashion and beauty trend is herbal cosmetics.

2 Since natural products provide the body with nutrients, improve health, and provide satisfaction because they are free from synthetic chemicals and have comparatively fewer side effects compared to synthetic cosmetics, today's women prefer natural products over chemicals for their personal care to enhance their beauty.

3 Both in their raw form and as a pure chemical upon which contemporary medicines are built, many of the most potent medications currently in the large drug arsenal at the disposal of modern medical science have been derived from herbal medicine.

4 The sole source of affordable, sustainable medicine for the expanding global population is renewable medicinal plants.

5 Environmentally friendly practises are used in the production and processing of therapeutic plants and herbal products.

Oral cosmetics



Fig. No 1

Dentifrices are preparations for external use that clean the teeth and the area around them. Mouth fresheners are preparations taken internally to prevent nausea and other unpleasant symptoms. They clean and refresh the inside of the mouth, preventing dental caries and periodontal illnesses. In order to keep the oral cavity healthy, it is now imperative to avoid dental and periodontal illnesses.

Dentifrices are further categorised by form into the following groups: toothpaste, fluid-form toothpaste, and liquid-form dentifrice. Tooth powder is the most common form, followed by moist (semi-kneaded) tooth powder. A suitable amount of mouthwash is placed in the mouth to rinse it out, and then it is expelled as a liquid dentifrice.

The uses of mouthwash, including its ability to freshen the mouth and clean the inside of the mouth, are also covered in this chapter. Dental caries and periodontal disorders can be prevented with the help of mouthwashes containing medicinal ingredients.

TYPES OF ORAL COSMETICS :

- 1) Dentifrices
- 2) Toothpaste 3) Mouthwash
- 4) Tooth Powder

Herbal toothpaste



Fig. No 2

There are many different dose forms in which herbs have been employed. There are many herbal formulations being utilised that comprise the plant or an extract of it that has been shown to have therapeutic efficacy. Modern dose forms have developed as a result of pharmaceutical technology advancements. The personal care product

category with the fastest growth is cosmetics. These cosmetic items come from plants and contain biologically active components or chemicals.

After 1945, several detergent formulation improvements started, with sodium lauryl sulphate being utilised as an emulsifier. But the situation has changed now. Focus has shifted away from excipients and toward the main component of formulation. In order to prevent and/or treat oral illnesses, the emphasis has recently switched to the release of active ingredients during formulation development. To clean and maintain the appearance and health of the teeth, toothpaste is a gel dentifrice paste that is applied using a toothbrush.

The usage of toothpaste helps keep teeth healthy and clean. The primary purposes of toothpaste are to help remove oral food debris from the teeth, to help treat and/or mask halitosis, and to release active chemicals like fluoride to help prevent tooth decay and gum disease (e.g., gingivitis). The idea behind this composition is to replace chemical antibacterial agents with herbal, readily available, inexpensive, and highly effective substances. ideal residences excellent abrasive effect non-toxic and non-irritating; does not stain teeth Maintain a healthy and clean mouth. extended impact It is affordable and widely accessible.

INGREDIENT USED IN HERBAL TOOTHPASTE :

GAVA leaves



Fig. No 3

Synonyms: Guava Bush and Strawberry Guava

Biological Source: The little medicinal tree *Psidium guajava* L. is a South American native.

Family : Myrtaceae

Chemical Constituent :

The primary phenolic chemicals found in guava leaves include isoflavonoid, gallic acid, catechin, epicatechin, rutin, and naringenin.

Uses

Inflammation is treated with it.

It is used to treat ulcers, lung illness, diarrhoea, and fever.

aids with weight loss.

aids in controlling blood sugar levels

helps to improve the texture of your skin.

CLOVE :



Fig. No 4

Synonyms: Lavang, clove buds, clove flower, and caryophyllum

Biological Source: *Eugenia caryophyllus* dried flower buds

Family: Myrtaceae

Chemical constituents: 1. Volatile oil (Clove oil) : 15%-20% a- Eugenol 70%-90%

b- Vanillin c- Caryophyllene d- Acetyl eugenol 4%

2. Tannin : 10-13% (Gallotannic acid)

3. Resin

4. Chromone

5. Eugenin

6. Small quantities of esters, ketones, alcohols

Uses

1 Since clove is recognised to have antibacterial characteristics, it is frequently found in mouthwash, toothpaste, and other dental products.

2 Eugenol is a compound found in clove oil, which is used to make vanillin for commercial use.

3 carminative

4 Antiseptic

Honey



Fig. No 5

Synonym: Madhu

Biological Source: The hive bee *Apis mellifera* and other species of ApIS from the family Apidae deposit a sweet material or secretion called honey in the honey comb.

Chemical Composition: Honey contains minor amounts of sucrose, dextrin, formic acid, fructose (40–50%), glucose (30–40%), and fructose (40–50%). contain colouring material, vitamins, enzymes, proteins, etc.

Uses

- 1 Honey is used as a sweetening and demulcent ingredient.
- 2 It is used as antiseptic.
- 3 It is used for wounds and burns.
- 4 used in cream, lotion, soft drink, and candy recipes.

Gum Acacia

Synonym: Acacia gum, gum arabic, and acacia

Biological Source: *Acacia arabica*, a member of the Leguminaseae family, produces dried sticky exudate that is used to make Indian gum.



Fig. No 6

Chemical Components: The main chemical component is arabin, which is a combination of arabic acid's calcium, magnesium, and potassium salts. The sole four chemical components of acacia were first believed to be (-) arabinose; (+) galactose.

Uses

- 1 Acacia tree mucilage is used as a demulcent.
- 2 It is widely utilised as a crucial pharmaceutical thickening agent and emulsification aid.
- 3 As a binding agent for tablets, it has a wide range of uses.

Material and method

Collection

The plant that produced the Fresh Green Guava Leaves was found in the Nesari Plant Garden in the Indian state of Maharashtra. The leaves were blended into a powder using a blender after being gently rinsed with water, sun dried to remove the moisture, and the powder was then passed through an aluminium sieve of 1mm to get consistent particle size. The dried guava leaf powder was kept in an airtight jar.

Guava Leaves extraction procedure:

Under sterile circumstances, 25 g of powdered guava leaves were dissolved in 100 cc of ethyl acetate and agitated for 24 hours. Whatman No. 1 filter paper was used to filter the extract, and the filtrate was then used for formulation and assessment.

Sr. No	Test	Observation	Inference
1	To test for protein, combine 3 ml of extract with 5 ml of Million's reagent.	Brick red ppt.	Protein is present
2	Lead acetate test for tannin: 0.5 ml of extract plus 1% lead acetate	White ppt	Tannin is present
3	Benedict's test for carbohydrates: Combine an equal volume of the test	Red colour solution	Carbohydrate is present

	solution with Benedict's reagent, and heat 5 minutes in a bath of hot water.		
4	Flavonoids On extra sulphuric acid (66% or 80%), perform the sulphuric acid test. It becomes dissolved in flavones and flavono and turns a rich yellow. solution. Chalcones and auronos produce red or reddish-blue hues. solutions	Deep yellow	Flavonoids is presenta
5	Wagner's test for alkaloids: 2-3 ml filtrate plus a few drops of Wagner's reagent	Reddish Brown colour	Alkaloids is present
6	Shake the medication extract or dry powder briskly with water to perform a saponin foam test.	No Foam observed	Saponin is absent

Preparation of toothpaste

Put all the necessary materials in the right amount of a mortar and pestle. Triturate after adding the components in ascending weight order. To create a paste with the correct thickness, add the desired amount of water. Put it in a container after filling it. The table provides comprehensive information about toothpaste formulation.

Chemicals

Calcium carbonate, Sodium Lauryl Sulphate, Glycerine, Gum Acacia, Peppermint oil, Honey, Methyl Paraben, Distilled Water.

Sr. No	Ingredient	Quantity given	Quantity taken	Uses
1	Psidium Guajava leaf extract	20	1 gm	Anti-carries agent
2	Calcium carbonate	35	3.5 gm	Abrasive agent
3	Sodium Lauryl Sulphate	1.5	1 gm	Foaming agent
4	Methyl cellulose	0.5	0.5 gm	Thickening agent
5	Methyl Paraben	0.1	0.1 gm	Preservative
6	Gum Acacia	1.5	1.5 gm	Binding agent
7	Peppermint oil	5		Flavouring agent
8	Glycerine	5	5 ml	Humectant
9	Honey	q. s	q. s	Sweetening agent
10	Distilled Water	q. s	q. s	Vehicle

EVALUATION PARAMETERS :**Abrasiveness**

On the butter paper, extrude the content to a length of 15-20 cm. For at least ten collapsible tubes, carry out the same procedure again. To check for the presence of sharp, hard-edged abrasive particles, press the contents of the length with the tip of your finger. Such particles shouldn't be present in toothpaste.

pH measurement

10 g of toothpaste in a 150 ml beaker should be weighed. 10 ml of boiled and chilled water should be used. Stir everything thoroughly to create a suspension. Using a pH metre, determine the suspension's ph.

Foaming ability

Take a suspension of the substance and shake it vigorously 12 times in a measuring cylinder. Count the amount of foam that is formed after 5 minutes of shaking. Procedure: Put 5 g of toothpaste in a glass beaker with 100 ml of water. 30 minutes should pass after adding 10 ml of water and covering the glass beaker with a watch glass. If there is detergent in the suspension, warm it up just enough to get rid of it. Transferring the suspension to a 250 ml measuring cylinder after stirring it with glass rods.

Check to see whether any foam is generated (more than 2 mL). By adding 5–6 ml of water, transfer the beaker's residual residue to the measuring cylinder. 50ml of water is then used to fill the cylinder. At 300C, stir the mixture with up-and-down motions to get a homogeneous suspension. After shaking, leave the cylinder standing for five minutes. Finally, take note of the volume that foam and water produced.

Loss of drying

In a porcelain dish with a 6 to 8 cm diameter and a depth of 2-4 cm, weigh 5 g of the sample. I kept the sample in the oven for 24 hours at 1050C. The sample was taken out of the oven after 24 hours, and a new weight was taken to determine the sample's overall moisture content.

Antimicrobial activity

On a petri dish, a sterile nutrient agar medium was produced and aseptically applied. A volunteer with distinctive teeth had the skin on their teeth cleansed with distilled water and allowed to dry. A cotton swab was then placed on the area and rubbed until it completely reached the skin around the teeth after being saturated in 5 cc of distilled water. This mixture was evenly applied to the previously ready surface. After solidifying, wells were drilled into agar plates containing inoculums using a sterile cork borer (6 mm in diameter). Then, an impact was created by omitting the herbal toothpaste before being inoculated on the petri plates of agar media. For 30 minutes, the plates were chilled to allow the toothpaste to properly diffuse into the agar. The plates were then incubated for 18 hours at 370C.

Result:

Phytochemical screening:

Phytochemical	Psidium Guava
1. Alkaloids	Present
2. Tannins and Phenolic Compounds	Present
3. Protein	Present
4. Terpenoids	Present
5. Flavonoids	Present
6. Glycoside	Present



Fig. No 7

Toothpaste Formulation:



Fig. No 8

Evaluation Test of Toothpaste :

Sr. No	Test	Observation
1	Physical Test: 1) Nature 2) Colour 3) Odour	Semi Solid Light Green Pleasant
2	pH	7.5
3	Abrasiveness'	There were 2 scratches present.
4	Foaming Ability	56% foam observed.

Abrasiveness' :

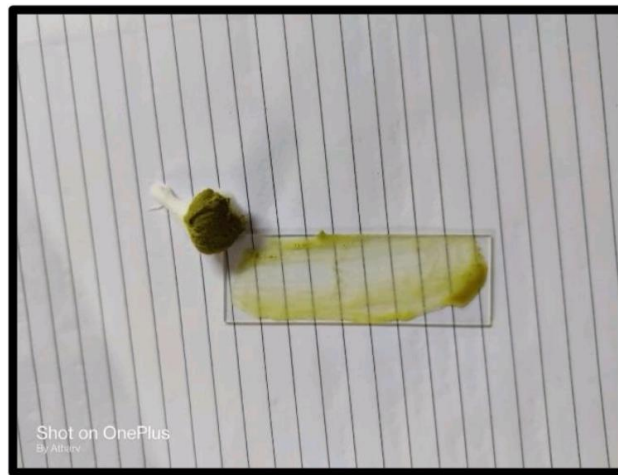


Fig. No 9



Fig. No 10

Foaming Ability:



Fig. No 11

Antimicrobial Activity

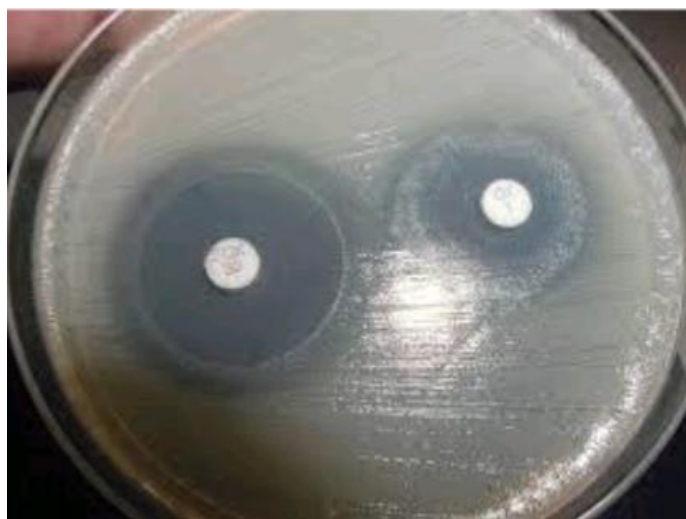


Fig. No 12

Zone of Inhibition :

With this concoction, the goal was to use herbal antibacterial agents rather than chemical ones, and it was successful. The toothpaste that was produced as a result passed all of the evaluation tests. We will surely think differently about herbal components as a result of this research. Such studies will influence how people view herbal toothpaste and other personal care items.



Fig. No 13

Conclusion

With this concoction, the goal was to use herbal antibacterial agents rather than chemical ones, and it was successful. The toothpaste that was produced as a result passed all of the evaluation tests. We will surely think differently about herbal components as a result of this research. Such studies will influence how people view herbal toothpaste and other personal care items.

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