IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

"Formulation And Evaluation of Herbal Toothpaste"

Mr. Sushant Shankar Navghare[1], Mr. Omkar Sudhakar More[1], Mr. Mangesh Suresh Borde[1], Mr. Siddheshwar Bandu Sapate[1], Dr. Rao[2].

1. **Student of Vss Institute of Pharmacy, Badnapur**
2. **Principal of Vss Institute of Pharmacy, Badnapur**

ABSTRACT

Toothpaste is a paste or gel to be used with a toothbrush to maintain and improve oral health and aesthetics. Toothpastes normally Utilized item with the guide of utilizing all people. Since their introduction several thousand years ago, these are the Products which issued for the cleaning, oral hugging or such as freshets of mouth and to avoid tooth decay.The aimed of current research to formulate herbal toothpaste utilizing plant extract like Neem leaves, Guava leaves, Cinnamon bark other ingredient are peppermint oil, Honey. The plant extract ingredient posses the antibacterial. The herbal toothpaste formulated which can satisfy all the required condition to keep the mouth fresh and prevent tooth decay by bacteria. The formulated herbal toothpaste compared with marketed preparation. Physical examination: Colour-greenish brown, smooth in nature, pH-6.8, spredability- Good and stable formulation, it was consider after the comparing the marketed preparation(Colgate, Dabour Red, Dantkanti) with formulated herbal toothpaste. It has been good scope in future dental research and dental health of public. The observation is Found to be from physical examination appearance, spread ability, relevant density, viscosity, pH, homogenecity, foam ability, Determination of moisture and volatile matter, antibacterial activity and Extrudability. The herbal toothpaste is no side effect and they prevent dental caries and dental disease.

1. INTRODUCTION

Since ancient times, toothpastes have been used and are a vital component of oral healthcare. Toothpaste is a dentifrice used to clean, maintain, and improve the health of teeth. It was first formulated in China and India between 300 and 500 BC. The primary purpose of toothpaste is to encourage oral hygiene. The term ―herbal medicines‖ refers to the utilisation of any plant material for therapeutic and disease-treating reasons. Throughout human history, there has been a widespread usage of herbal remedies, and The most popular preventive method for oral health care is toothpastes. Dentifrices that are sold commercially make claims about having antibacterial characteristics, but little study has been done to verify these claims.As a result, this study was carried out to assess the effectiveness of various toothpaste formulations in lowering the oral microbial burden. The World Health Organization (WHO) estimates that around 80% of people worldwide utilise herbal medicine as their primary form of healthcare. Furthermore, more than 35,000 plant species have been used by different human beings. numerous cultures around the world for medical reasons. Some of them have strong antibacterial, antiviral, anticancer, and antifungal properties. The chosen tooth paste formulations were successful in keeping the bacteria population under control, helping to uphold good oral hygiene. The efficiency of the various chemicals in the toothpastes used, however, is less important for maintaining excellent dental health than using the proper brushing technique and oral hygiene procedures.

The neem has been antibacterial activity is has evaluated from the ancient times. It has been use for the various activities like as astringent, antiseptic, insecticidal, anti ulcer and for cleaning the teeth in pyorrhea and other dental disease. The leaf extract of neem showed superior antiviral and antihyperglycemic activity in vitro and in vivo on animals.

The extract are use in various category like NeemAntibacterial, Guava-Anti-inflammatory, BabulAstringent, Kalmi-Flavoring agent.

The aim of study was to formulate herbal base product was compare the efficacy with conventionally marketed formulated toothpaste and evaluated the various parameter like colour, spredability, foamability, extrudability and anti-bacterial activity. However, there is approach to provide the formulation for commercial production of herbal dental product with environmental friendly attributes.[1]

KEYWORD: Neem, Guava, Cinnamon, Babul, Evaluation.

2. Benefits of herbal toothpaste

Your mouth's bacteria can lead to gingivitis and other dental problems. Natural toothpastes can remove oral bacteria without the use of dangerous chemicals. To freshen your breath, natural toothpastes employ natural components like mint and other herbs.

Cleans your teeth safely.

Effectively refreshes your breath.

Prevents and calms gum pain.

Stain Remover.

Safe for children.

Objective of herbal toothpaste

1. The plant extract ingredient has antibacterial properties.

2. The formulation of a herbal toothpaste that can satiate every prerequisite for maintaining oral hygiene and preventing bacterial tooth decay.

3. Ideal properties of toothpaste

1. Strong abrasive action.

2. Non-toxic and non-irritating

3. Leave no stains on the teeth

4. Maintain a healthy and clean mouth

5. Long-lasting impact

6. Accessible and affordable

7. The oral fluid and tissue shouldn't be harmed.

8. It must not discolour teeth.

9. It should smell good and pass the test.

10. No drugs should be taken.[2]

4. Advantages of Herbal Toothpaste

1. Simple to use.

2. The ADA has approved numerous products.

3. Fluoride may be present to prevent cavities.

4. No one wants their body to be filled with chemicals, and even toothpaste sold in stores contains these harmful substances. To prevent tooth decay, we must use the natural alternatives that are already available.

Herbal toothpastes provide a lot of benefits.

5. Sodium laurel sulphate, a component of commercial tooth paste, can irritate and inflame the gums while brushing. But there are no chemical ingredients in herbal toothpaste.

6. Natural oral care products work well to get rid of bacteria and maintain a healthy mouth.

7. Herbal toothpaste contains peppermint and spearmint oils, which aid in killing bacteria.

Disadvantages of Herbal Toothpaste:

1. Organically certified herbal toothpaste is the safest option; otherwise, our teeth could potentially beendangered.

2. It shouldn't include cinnamon or any synthetic chemicals or dyes.

3. May originate from producers who aren't honest about their business operations or who don't adequatelylabel substances, including fluoride, which some people find concern.

4. If toothpaste is ingested in any amount continuously, it can be acutely poisonous of toothpaste has beenfound to be the real culprit in the development of some conditions, including tooth sensitivity and enamelthinning.

5. Chloroform, a human carcinogen, is created when the active ingredient in many toothpastes, triclosan,combines with the chlorine in tap water.

6. According to some scientists, it can cause brain damage to unborn children.[3]

5. Plan Of Work:

1) Preparation of Herbal Ingredients:

•If using powder form, ensure neem and babul are finely ground.

•If using extract, ensure they are prepared and concentrated properly.

2) Mixing Base Ingredients:

•Combine abrasive, humectants, and binding agents in a large mixing vessel.

•Mix until a smooth base is formed.

3) Incorporating Herbal Components:

•Add neem and babul to the base mix, ensuring even distribution.

•Continue mixing until fully incorporated.

4) Adding Surfactants, Flavors, and Sweeteners:

•Add surfactants to enhance the foaming action.

•Introduce flavors and sweeteners, adjusting to desired taste.

5) Incorporating Preservatives:

•Add preservatives to ensure stability and prevent microbial growth.

6) Final Blending and Homogenization:

•Mix the formulation thoroughly to ensure a consistent texture and color.

•Use homogenization if required to achieve a smooth consistency.

7) Quality Control and Testing:

•Test for pH, consistency, texture, and microbial contamination.

•Conduct sensory tests to ensure taste and usability meet standards.

8) Packaging:

•Fill the toothpaste into tubes or containers.

•Ensure packaging is sealed properly to prevent contamination.

9) Labeling and Compliance:

•Label the product with all necessary information, including ingredients, instructions, and safety warnings.

•Ensure compliance with local regulations and standards.[4]

6. Material And Methods:

One formulation of herbal toothpaste is prepared by using different ingredients like Calcium Carbonate as abrasive, Glycerin as humectant, Sodium Lauryl Sulphate as a detergent and foaming agent, Peppermint Oil as a flavoring ingredient, methyl paraben as a preservative, and Sodium Saccharine as a sweetener. In addition, an anti- inflammatory substance derived from ginger oil is included. A method used for the formulation of herbal toothpaste is homogenization by using mortar and pestle for formation base of toothpaste.

Materials

The weight of each ingredient was determined based on the results of a previous study on the composition of herbal toothpaste. All of the ingredients in this toothpaste have a combined percentage by weight of 100%, which implies that the whole quantity of toothpaste will yield 100gm of toothpaste formulation.

The weight of every ingredient was decided by review. previous study formulation of Herbal toothpaste. We have manufactured three herbal toothpastes by different composition of chemicals and plant extract as given in table.[5]

Ingredients that used in formulation of herbal toothpaste:

Table No. 01

Sr. No.	Ingredients	Quantity (gm) F1	Quantity (gm) F2	Quantity (gm) F3
1	Calcium Carbonate	10	15	25
2	Sodium Lauryl Sulphate	5	10	15
3	Glycerin	5	10	15
4	Gum Tragacanth	2	3.5	5
5	Water	q.s.	q.s.	q.s.
6	Honey	2	3.5	5
7	Methyl Parabean	0.5	0.75	1
8	Pappermint Oil	0.5	0.75	1

Plant Extract

Table No. 02

Ingredients	Quantity (gm) F1	Quantity (gm) F2	Quantity (gm) F3
Dry Neem Leaves	5	10	15
Babul Leaves	3.5	7.5	10
Guava Leaves	3.5	7.5	10
Cinnamon Powder	3.5	7.5	10

- **Name: Neem**

Family: Meliaceae

Botanical Name: Azadirachtaindica

Organoleptic Properties:

Colour: Dark green

Odour: Pungent

Taste: Bitter taste (Reported)

Appearance: Neem leaves are typically dark green in colour.

Neem bark is used as an active ingredient in a number of toothpastes and toothpowders. Neem bark has anti-bacterial properties, it is quite useful in dentistry for curing gingival problems and maintaining oral health in a natural way. Neem twigs are used as oral deodorant, toothache reliever and for cleaning of teeth.[6]

- **Name: Babul**

Family: Fabaceae

Botanical Name: Acacia nilotica

Organoleptic Properties:

Colour: Grey green

Odour: Unpleasant odour

Taste: Astrigent (Reported)

Appearance: Babul leaves are typically green in colour and have a bipinnate structure.

Leaves dried and mixed with mustard oil are used as toothpaste. This paste is very good for maintaining the overall dental health, countering bad breath and massaging the gums. The paste is also useful in treating Pyorrhea (gum disease) and other tooth disorders.[7]

- **Name: Guava**

Family: Myrtaceae

Botanical Name: Psidiumguajava

Organoleptic Properties:

Colour: Typically green

Odour: Pleasant or fruity

Taste: Slightly bitter (Reported)

Appearance: Simple,opposite leaves that elliptic to ablong in shape.

The leaf extract of guava has traditionally been used for its health benefits. Toothpaste is a dentifrice used clean, maintain and improve the health of teeth. Guava leaves were washed with distilled water and shade dried for three days and then powdered for extraction.[8]

- **Name: Cinnamon (Kalmi Bark)**

Family: Lauraceae

Botanical Name: Cinnamomumverum

Organoleptic Properties:

Colour:warm brown

Odour: Spicy odour

Taste: Strong woody (Reported)

Appearance: Raddish brown to brown coloured stricklyraddish brown powder.

Kalmi bark is used in herbal toothpaste because besides protecting teeth from various types of dental problems, kalmi bark is also effective in sensitive teeth, reducing gingivitis and teeth stains and eliminates bad breathing.[9]

- **Name: Honey**

Family: Apidae

Scientific Name: Apismellifera

Organoleptic Properties:

Colour: Water white

Odour: Sweet

Taste: Floral fruity

Appearance: Viscous syrupy liquid consistency.

Honey is generally used in toothpaste not only for stops the growth of dental plaque bacteria, but also reduces the amount of acid produced, which stops the bacteria from producing dextran that is a component of dental plaque.[10]

7. Formulation:

First of all, we collected Neem leaves and guava leaves from the tree, then all plant raw ingredients (neem leaves, guava leaves, kalmi bark, babul leaves)are allowed to dry in pharmaceutics lab. After 4-5 days the leaves are dried. All the leaves are grinded by the help of a grinder. After grinding the powder form of ingredients is formed. Weight the quantity of each and every chemical by the help of weighing balance. Now mix the guava and neem leaves, kalmi bark, babul leaves according to the quantity measured. After that mix all the ingredients one by one except Methyl paraben, which is used as preservative in the toothpaste. If the toothpaste is not thick and add sufficient quantity of water in it. Collect in the final container. Toothpaste is ready and stored in lab.[11]

Final Preparation:

After manufacturing the three sample, I select one sample which is best in physical examination. Then I prepare 100 gm of the selected sample by increasing the quantity of materials.

Quantity of material for manufacturing 100 gm Herbal toothpaste.

Table No. 03

Sr. No.	Ingredients	Quantity Taken
1	Calcium Carbonate	15
2	Sodium Lauryl Sulphate	10
3	Glycerin	10
4	Gum Tragacanth	3.5
5	Water	q.s.
6	Honey	3.5
7	Babul Leaves	7.5
8	Guava Leaves	7.5
9	Neem Leaves	10
10	Cinnamon	7.5
11	Methyl Parabean	0.75

8. Procedure:

1. Grind the Babul leaves and Neem leaves:

Grind the Babul and Neem leaves separately into a fine paste using a mortar and pestle or a grinder.

2. Mix Calcium Carbonate and Gum Tragacanth:

In a mixing bowl, combine the Calcium Carbonate and Gum Tragacanth. These act as abrasives and thickeners in the toothpaste.

3. Add Cinnamon Powder:

Add the cinnamon powder to the mixture. Cinnamon provides a pleasant flavor and has antimicrobial properties.

4. Incorporate Sodium Lauryl Sulphate (SLS):

SLS is a foaming agent. Add it to the mixture to create the foaming action characteristic of toothpaste.

5. Blend in Glycerin and Water:

Glycerine helps to retain moisture and provides a smooth texture. Mix it with water before adding it to the paste to ensure even distribution.

6. Integrate Methyl Paraben: Methyl Paraben is a preservative. Add it to the mixture to prolong the shelf life of the toothpaste.

7. Add Honey:

Honey has antibacterial properties and adds sweetness. Incorporate it into the mixture for its health benefits and flavor.

8. Mix in Babul and Neem Paste:

Add the ground Babul and Neem paste to the mixture. These ingredients have antimicrobial properties and contribute to oral health.

9. Adjust Consistency:

Depending on the desired consistency, you may need to add more water or Calcium Carbonate to achieve the right texture.

10. Store:

Transfer the toothpaste into a clean, airtight container for storage.[12]

9. Evaluation Test of Toothpaste

1. Physical Examination of herbal toothpaste

• **Color**: The formulation toothpaste was examine for its color and checked color visually

• **Odor**: The odor was checked by smelling the product.

• **Smoothness**: The Smoothness was tested by rubbing the formulation paste between the fingers.

• **Taste**: Taste was checked manually by tasting the Formulation.

1. Abrasiveness

Extrude the content 15-20 cm long on the butter paper; repeat the same procedure for at least ten collapsible tubes. Press with the contents of the entire length with fingertips for the Presences of sharp and hard edged abrasives particles. Toothpaste do not contain such particles.

2. Uniformity

The toothpaste shall extrude a similar mass from the collapsible tube or any appropriate container by applying of normal force at 27+20C. In addition, size of contents shall extrude from the fold of container and then rolled it gradually.

3. Foamability

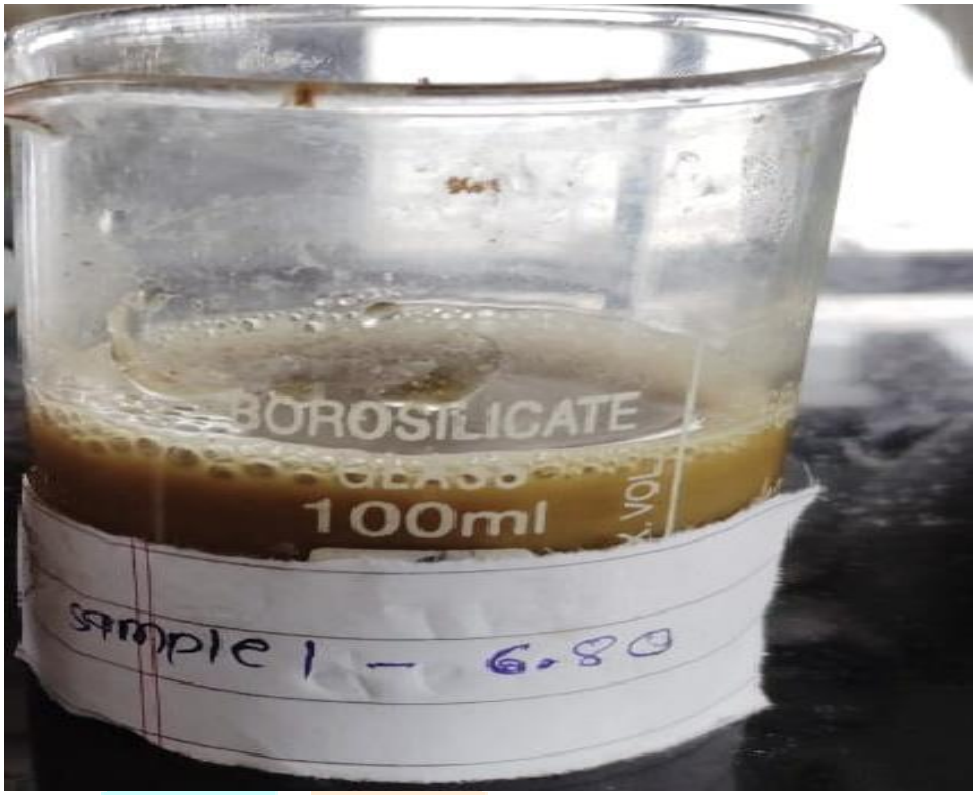
The foaming power (Foamability) of herbal toothpaste was determined by taking 2gm of toothpaste with 5ml water in measuring cylinder primary volume was noted and then shaken for 10 times. Final volume of foaming was noted.

4. Foaming

The foamability of formulated toothpaste evaluated by taking small amount of formulation with water in measuring cylinder initial volume was noted and then shaken for 10 times. Final volume of foam was noted Determination of froth power Foaming power = V1–V2 V1- Volume in ml of foam with water. V2- Volume in ml of water only.

5. pH

PH of formulation herbal toothpaste was determined by using pH meter. 10g of toothpaste situated in 150ml of beaker. Allow the 10ml of boiled then to cooled water. Stirring vigorously to make a suspension.[13]



6. Moisture content

Toothpaste (10 gm) weighted in a Porcelain dish and dried it in the oven at 105 o C. It was cooled in a desiccater. The loss of weight is recorded as percentage moisture content and calculated by the given formula. % Moisture = Original sample weight – dry sample weight/ Original sample weight[14]

Evaluation Results:

Tests	Result
Colour	Brownish
Odour	Slightly characteristics
Taste	Sweet, slightly bitter
Smoothness	feelsomewhat gritty
Abrasiveness	Gentle abrasives
Uniformity	Achieve a uniform
Foaming	more froth and bubbling
pH	6.8

10.Conclusion and Result:

Conclusion:

The research concluded that Herbal toothpaste an emphasizing and more acceptable in dental research and they are safer with minimum side effect than synthetic preparation.The formulated tooth paste capable to the tooth and oral hygine and show the anti-microbial activity against pathogen. The formulation compared with market prepartion. Therefore it shows the equal patronizing and engrossing passion over the marketed formultions . The fomulated herbal toothpaste has been good scope in future in nature remedies research and Dental health of public.

Result:

The herbal tooth paste formulation was prepared from Neem leaves, Guava leaves, cinnamon bark, natural ingredient and small amount of synthetic ingredient.The formulated herbal toothpaste greenish brown in colour and showed the good homogeneity with absence of lumps and good anti-microbial activity. The pH having 6.8.

Sr.No.	Parameters	In lab formulation
1	Appearance	Brownish
2	pH	6.8
3	Odour	Characteristic
4	Spredability	3.9cm/sec
5	Abrasiveness	Good abrasive
6	Foamability	10.2
7	Moisture content	15.90%

11.Reference:

1. Roshan Telrandhe, PavanDeshmukh, MahendraGunde, Formulation and Evaluation of Herbal Toothpaste: Compared With Marketed Preparation, International Journal Of Pharmaceutics & Drug Analysis Vol.5 Issue 10, 2017; 406 – 410.
2. NidaMulla, Sanjay K. Bais and Pratiksha Y. Shiraskar, Herbal Toothpaste For Antibacterial Activity: A Review, World Journal Of Pharmacy And Pharmaceutical Sciences, Volume 12, Issue 3, 162-180.
3. Mr. Pratik ArunRajale, Mr. Vishal Gaikwad, A Review On: Herbal Toothpaste, JETIR June 2024, Volume 11, Issue 6, 509-520.
4. Mr. Mahadeo G. Dhote, Prof.Shere M.G., Mr. Dnyandeep S. Jadhav,Formulation Of Herbal Toothpaste, IJCRT | Volume 12, Issue 6 June 2024,881-889.
5. BhogeMaheshwari Sunil, Shyamlila B. Bavage, Nandkishor B. Bavage, Formulation And Evaluation of New Herbal Toothpaste, IJIRT | Volume 8 Issue 3 August 2021,169-172.
6. I. V. Srinivasa Reddy and P. Neelima, Neem (Azadirachtaindica): A Review on Medicinal Kalpavriksha, International Journal of Economic Plants 2022, 9(1):059-063
7. RushdaSaeedi, Arshiya Sultana, Khaleequr Rahman, Medicinal Properties Of Different Parts Of Acacia Nilotica Linn (Babul), Its Phytoconstituents And Diverse Pharmacological Activities, Int J Pharm PharmSci, Vol 12, Issue 2, 8-14.
8. Muhammad Anees Ur Rehmana, IdressKhanb, Medicinal and pharmacological potential of Guava leaf powder, AReview, International Journal of Natural Medicine and Health Sciences ISSN:2790-2471.
9. PasupuletiVisweswara Rao and Siew Hua Gan, A review:Cinnamon: A Multifaceted Medicinal Plant, Hindawi Publishing CorporationEvidence-Based Complementary and Alternative MedicineVolume 2014, Article ID 642942, 12
10. Saeed Samarghandian, Tahereh Farkhondeh1 ,FariborzSamini, Honey and Health: A Review of Recent Clinical Research, Pharmacognosy Research, Volume 9, Issue 2, April-June, 2017:121-127.
11. K.L. Senthilkumar, S. Venkateswaran, A. Vasanthan, P. Chiranjeevi, N Mohamed, S. Dinesh, K.L.S. Neshkumar, Original Research Article:Formulation development and evaluation of novel herbal toothpaste from natural source,International Journal of Pharmaceutical Chemistry and Analysis,2022;9(1):17–21.
12. PavanDeshmukh, Roshan Telrandhe, MahendraGunde, Research Article:Formulation and Evaluation of Herbal Toothpaste: Compared With Marketed Preparation, International Journal Of Pharmaceutics & Drug Analysis Vol.5 Issue 10, 2017; 406 – 410.
13. Magar Puja S, More Sonali R, ValaviPradnya N, SonawaneGauri M, GawandeTrupti S, Jadhav Vaibhav N, JatharAniket G and GhodakeSimran S, Innovative herbal formulations in dental care:

Evaluation of a natural dentifrices, International Journal of Pharmacognosy and Life Science 2024; 5(2): 40-43.

14. Nikita M. Rathi, Shital V. Sirsat, Sanket S. Toshniwal, Nikita T. Zagare, Shaikh Fazil Shaikh Mahamad,Formulation and Evaluation Study on Herbal Toothpaste: A Review, IJNRD | Volume 7, Issue 4 April 2022, 968-974.