

## Formulation and Evaluation of Herbal Toothpaste: In Vitro Study

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### ABSTRACT

This work was carried out to prepare and evaluate an herbal toothpaste which can be used as a tool for proper oral hygiene and to overcome the side effect of the conventional toothpaste by synthetic ingredients. Neem (*Azadirachta indica*), babul (*Vachellia nilotica* or gum arabica tree), and Amrud (*Psidium guajava* or Guava) are the herbal ingredients that are used to formulate herbal toothpaste which can satisfy all the required properties. The prepared toothpaste was evaluated for its Organoleptic and physical characteristics to ensure that it possesses all the desired features to use against dental diseases. The result was found to be within permitted limits.

**Keywords:** Herbal toothpaste, Evaluation, Oral hygiene

### INTRODUCTION

Eating cleanliness is an important thing to look good, maintain a person's reputation and maintain confidence. The tooth contains two parts, pimples, and roots. The tooth crown is covered by the outer surface and this is the most difficult tissue in the tooth. Enamel's main design is water and keratin besides other hydroxyl appetites [1]. Toothpaste is a dentist used to clean, maintains, and improve the health of the tooth. Toothpaste primarily works as a stimulant to oral hygiene and helps in preventing dental packs and food grains from the tooth that helps in the removal of halitosis and/or the screening of halitosis and helps prevent fluoride, including tooth and gum disease (e.g., gingivitis) [2-9]. Neem is the most widely revised tropical tree for developmental treatment. Twenty years ago, neem extracts were analyzed [3]. Dendrefries can be made by synthetic and herbal ingredients. In comparison with synthetic formulations, the herbal formulation is in high demand due to its efficiency and low side-effects. Herbal dental toothpaste, toothpowder, soft whistles, etc. are available in various formulas such as Plaque can be removed with effective toothpaste and tooth powder, because the presence of these components gives bacterial, antiseptic wealth and gives it fresh and cold emotions [4-11].

### MATERIALS AND METHODS

#### Chemicals

Calcium carbonates, Para hydroxyl benzoic acid, Sodium lauryl sulphate, Sodium chloride, Camphor, Honey were purchased from the market.

**Formulation** [1,2,5,7,8]

All herbal ingredients have been dried and grounded using a domestic mixer. The materials needed for the required quantity were taken into the weight and mortar. Calcium carbonate, sodium lauryl sulphate, methylcellulose, honey, and glycerin were mixed in water. Almonds were added to the above mixture. These solutions are included in the mortar contained in herbal constituents and triturated well until paste compatibility is ready (Table 1) [5].

### EVALUATION OF TOOTHPASTE

- Color:** The prepared toothpaste was evaluated for its color. The color was checked visually [1,2,5,7,8].
- Odor:** Odor was found by smelling the product [1,2,5,7,8].
- Taste:** Taste was checked manually by tasting the product [1,2,5,7,8].
- Smoothness:** The Smoothness was tested by rubbing the paste formulation between the fingers [1,2,5,7,8].

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**5. Determination of sharp and edge abrasive particles:**

To check the presence of any sharp or tight particles 15-20 cm. Dismiss long-length material on fingers and butter paper. Repeat the same process for at least 10 times. No sharp or firm particles were found [1,2,5,7,8].

**6. Determination of Spreadability:**

Take one gram of toothpaste placed on a glass slide (10 x 10 cm) and cover it with another glass slide. Then keep the weight of two kilos on the covered glass slide (not sliding). After 3 minutes the spread of toothpaste (cm) is measured. Repeat the experiment and took the average value of the three lectures [1,2,5,7,8].

**7. pH determination:**

150 grams of beaker had 10 grams of toothpaste. Boiled and then add 10 ml of cold water. Strong enthusiasts to suspend predicted the pH of the suspension using a pH meter [1,2,5,7,8].

**8. Determination of lead:**

The color produced with a sample solution containing hydrogen sulphide is compared with a standard lead solution [1,2,5,7,8].

**9. Foaming power:**

Take a suspension of the material in measuring cylinder, shaken the suspension for 12 times and measured the volume of the foam produced after shaking for 5 min.

**Procedure:** Weighed 5 grams of toothpaste in 100 ml of the beaker. Add 10 ml of water and cover the glass beaker with a glass of glass and put it aside for 30 minutes. If present, heat dissolving gradually to dissolve the detergent. Transfer 250 ml cylinders by moving suspension with a glass rod. If no foam is prepared, inspection (more than 2 ml). Add 5-6 ml of water and

transfer the remains in the beaker to measure the cylinder. Then make up the cylinders with 50 ml of water. 30s Move content with the movements above to get a uniform suspension on after pushing, keep the cylinder aside and keep it for 5 minutes. And the last tip foam + water tones [1,2,5,7,8].

**10. Determination of moisture and volatile matter:**

6-8 cm Sample 5g in diameter and 2-4 centimeters of porcelain dish in the room. Dry the sample at 105°C in the oven [1,2,5,7,8].

**Calculation**

$$\% \text{ By mass} = 100 M1 / M$$

M1 - loss of mass (in grams) on drying

M - Mass (in grams) of the material taken for the test

**11. Stability study:**

The toothpaste should be stable, but not to be deteriorating, ferment and segregate during normal storage conditions and usage. The stability of toothpaste can be tested when it exposes to 45±2°C for 28 days. After storage, no phase separation, fermentation, and gassing can be observed. Also exposed to refrigerator conditions such as 2-8°C for 24 h, no obstruction of extrudable form from the container is observed [1,2,5,7,8].

**12. Homogeneity:**

The toothpaste shall extrude a homogenous mass from the collapsible tube or any suitable container by applying normal force at 27±2°C. Also, the bulk of contents shall extrude from the crimp of the container and then rolled it gradually [1,2,5,7,8].

**Table 1.** Evaluation of toothpaste.

Ingredients	Biological Name	Use	Quantity (g)
Neem Leaves	Azadirachta indica (Meliaceae)	Antibacterial	0.5
Babul leaves	Acacia Arabica (fabaceae)	Astringent	0.5
Ginger	Zingiber officinale (Zingiberaceae)	Antiseptic	0.5
Mint	Mentha Piperita (Lamiaceae)	Flavoring agent	0.5
Camphor	Cinnamomum camphora (Lauraceae)	Antiseptic	0.5
Honey	Apis mellifera (Apidae)	Sweetening agent	0.5
Calcium carbonate	-	Abrasive	3.5
Glycerin	-	Humectant	2 ml
Methylcellulose	-		0.5
Sodium Lauryl Sulphate	-	Detergent	0.5
Sodium chloride	-	Antimicrobial activity	0.5
Distilled water	-	Vehicle	q.s
Methyl Paraben	-	Preservative	0.2
Amaranth Solution	-	Coloring agent	0.1 ml

## RESULTS AND DISCUSSION

The herbal toothpaste formulation was prepared from natural ingredients (neem, babul, amrud leaves) and a small number of synthetic ingredients. At the trial phase of formulation, three batches were performed due to the problem like homogeneity, spreadability and foamability the two batches discarded permanently, and the only single batch was selected for next steps. The formulated herbal toothpaste is greenish brown in color (**Tables 2 and 3**).

**Table 2.** Physical Examination.

S No.	Parameter	Observations
1	Color	Greenish brown
2	Odor	Characteristic
3	Taste	Characteristic
4	Smoothness	Smooth

**Table 3.** Evaluation results.

S No.	Parameter	Observations
1	Abrasiveness	Good abrasive
2	Spreadability	5.1cm/sec (easily spreadable)
3	pH	8.0
4	Lead	Absent
5	Foaming power	Good
6	Moisture Content	10%
7	Stability	Stable
8	Hard and sharp edge particles	Absent
9	Homogeneity	Good

## CONCLUSION

The research concluded that herbal toothpaste an emphasizing and more acceptable in dental research and they are safer with minimum side effects than synthetic preparation. The formulated toothpaste shows the anti-microbial activity against pathogens. Any herbal toothpaste is considered safe to use twice a day and it does not cause any harmful effect, instead imparts good freshness and away from bad odor.

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