

Formulation and Evaluation of Herbal Toothpaste using Various Herbal Ingredients

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Abstract: *The formulation and assessment of a herbal toothpaste is the main objective of the study. With the help of all people, toothpaste is a commonly used product. Typically, toothpaste is used to clean the mouth and enamel. Additionally, it is utilised to treat a variety of enamel problems. Many dentists advocate using toothpaste for diseases including chronic gingivitis and sensitivity, among others. The ingredients used in herbal toothpaste formulations include Neem leaves, Black pepper, Babul leaves, clove oil, and turmeric. These herbal toothpastes are assessed using a variety of methods, including physical examination, pH measurement, Among other things, homogeneity, sharp and edged abrasive particles, moisture and volatile matter determination, spreadability, stability research, extrudability, etc. The goal of this research is to create a herbal toothpaste that is effective for gum bleeding and oral hygiene.*

Keywords: Herbal Toothpaste, Herbal ingredient, Antibacterial activity, Neem leaves, black pepper, Babul leaves, Abrasive

I. INTRODUCTION

The ingredients used in herbal toothpaste formulations include Neem leaves, Black pepper, Babul leaves, clove oil, and turmeric. These herbal toothpastes are assessed using a variety of methods, including physical examination, pH measurement, Homogeneity, Edge-cutting abrasive particles, The best preventive method for maintaining dental health is using toothpaste. There are many commercially available dentifrices that claim to have antibacterial qualities, but few research have been done to evaluate those claims. It is well known that we began using dentifrices as a method of cleaning our teeth more than 2000 years ago, and the use of toothpicks and brushes is an even older practise. Many of the principles used to make dental floss centuries ago are being used in modern toothpaste. It is suggested and recommended to use natural or Ayurvedic medicines for routine fitness. [1]

In the developed world, toothpaste is nearly routinely used, however in some groups and cultures, traditional tooth cleaning without dentifrice is still practised, using items like a miswak or salt as an alternative. Since ancient times, people have used dentifrices (toothpastes), but recently, formulations that deliver active. There are now substances designed to treat and/or prevent oral illnesses. Other reviews of toothpaste history are available.[2]

Herbal medicine is defined as the use of any component of flora for functions related to healing and the treatment of illnesses. In accordance with the World Health Organisation (WHO), over 80% of the human population used natural medical drugs as their primary form of healthcare. Herbal medication therapies have been used widely throughout recorded human history. More than 35,000 plant species were also recommended for usage in various human civilizations around the world for scientific purposes. Some of them have powerful antibacterial, diabetic, viral, cancer, and fungal properties. Oral hygiene is, in other words, the practise of keeping your mouth and teeth healthy to prevent dental issues, most commonly dental cavities, gingivitis, periodontal (gum) diseases, and bad breath. Maintaining oral hygiene includes, among other things.[3]

Neem has antibacterial and anti-inflammatory properties. Neem additionally has anti caries properties. The antimicrobial outcomes of neem were said towards *S.mutans* and *S.faecalis* .Dried chewing sticks of neem indicates most antibacterial interest towards *S.mutans*. There is constrained research to be had concerning the efficacy of natural dentifrices subsequently the existing take a look at turned into undertaken to evaluate their impact on oral hygiene and gingival bleeding [4].

Enamel is shielded, cleaned, and polished by toothpaste. It increases the effectiveness of oral hygiene. It is spotless taste, aroma, and breath freshening. Maintaining a healthy mouth requires brushing twice a day using toothpaste.[5]

The formulation and assessment of a herbal toothpaste is the main objective of the study. With the help of all people, toothpaste is a commonly used product. Typically, toothpaste is used to clean the mouth and enamel. Additionally, it is utilised to treat a variety of enamel problems. Many dentists recommend using toothpaste to treat conditions including sensitivity and chronic gingivitis, among others

Ideal Properties of Toothpaste: - It should not be harmful to the oral tissue & fluid. It should not stain teeth. It should not be scratching to the enamel surface of tooth. If it is ingested, it should not be harmful to the G.I.T. It should have pleasant odour & taste.

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II. MATERIALS AND METHODS:

Chemical: -1. Calcium carbonate, 2. Salt, 3. Camphor, 4. Sodium laurylsulfate, 5. Methyl paraben

Plant collection: -

The following ingredients are collected from S.I.O.P campus, local area and local market.

1. Neem leaves
2. Black pepper
3. Babul leaves
4. Clove oil
5. Turmeric
6. Mint

Formulation: -

There are two types of toothpaste formulation procedures, viz. 1. Dry gum method, 2. Wet gum method,

Preparation of base

1. The solid ingredients calcium carbonate, sodium lauryl sulphate, Salt, Camphor, Methyl paraben were weighed accurately as mentioned in the formula and sieved with sieve no.80 to maintain the particle size.
2. These ingredients were also mixed in a mortar and pestle, then triturated with precisely weighed clove oil until a semisolid substance was created.
3. Addition of herbal ingredients
4. Accurately weighed herbs powder of neem leaves, babul leaves and black pepper were added to the base
5. Then addition of turmeric as a flavouring agent
6. At the end, peppermint oil was added as a flavor.[6]

Making of herbs powder: -

1. First wash the neem leaves, babul leaves and black pepper with water
2. After the washing of dry the herbs in the shade presence of sunlight for 2 or 3 days
3. When the herbs are dried then they are grinding in a grinding machine separately
4. The grinding of herbs should be fine in size
5. Then the obtain powder is pass through the 80.no sieve
6. The store in tightly close container[7]

Composition: -

All ingredients should be complied with the Indian standards. Toothpaste is not composed of mono or disaccharides such as sucrose or fermentable carbohydrates.

Table 1: Composition table of Herbs: -

Sr. no	Ingredient	Quantity(g)	Use
1	Neem leaves 0.5 Antibacterial	0.5	Antibacterial
2	Black pepper 0.5 Antioxidant	0.5	Antioxidant
3	Babul leaves 0.5 Astringent	0.5	Astringent
4	Clove oil 0.5 Antiinflammatory	0.5	Antiinflammatory
5	Turmeric 0.5 Colourings agent	0.5	Colourings agent
6	Peppermint oil 0.5 Flavouring agent	0.5	Flavouring agent

Table 2: Composition table of chemicals

Sr. No	Ingredient	Ingredient Quantity(g)	Use
1	Calcium carbonate	4.0	Abrasive
2	Salt	0.5	Abrasive
3	Camphor	0.5	Antiseptic
4	Sodium lauryl	0.5	Foaming agent
5	Methyl paraben	0.5	Preservative
6	Water	Q.S	Vehicle

Evaluation of Toothpaste: - [8][9][10][11]

1. Physical Examination

- Colour- Formulated toothpaste was evaluated for its colour.
- The visually colour was checked.
- Odour- Odour was found by smelling the product .
- Taste- Taste was checked manually by tasting the formulation

2. pH-

PH of formulated herbal toothpaste was determined by using pH meter. 10g of toothpaste placed in 150ml of beaker. Allow the 10ml of boiled and then cooled water. Stir vigorously to make a suspension.

3. Homogeneity-

The toothpaste shall extrude a homogenous mass from the collapsible tube or any suitable container by applying of normal force at $27 \pm 20^\circ\text{C}$. in addition bulk of contents shall extrude from the crimp of container and then rolled it gradually.

4. Sharp and edge abrasive particles-

To verify for the presence of any sharp or abrasive particles, the contents were placed on the finger and scratched on the butter paper for 15-20cm. I went through the same process at least ten times. There were no sharp or edge abrasive particles discovered

5. Determination of moisture and volatile matter-

5gm of herbal toothpaste was placed in a porcelain dish with a diameter of 6-8cm and a depth of 2-4cm to determine moisture and volatile matter. At 105 degrees Celsius, it was dried in an oven. Calculation
 $\% \text{ by mass} = \frac{100(MI - M)}{M}$, MI-Loss of mass (g) on drying, M- Mass (g) of the material taken for the test.

6. Spreadability-

About 1 gm of tooth paste is weighed at the center of glass plate (10x10 cm) and another glass plate is placed over it carefully. At the center of the plate a 2 kg weight is placed. After 30 minutes, the diameter of the paste is measured in cm. The experiment is repeated thrice and average diameter is determined.

7. Stability study-

The toothpaste shall be stable, but not to be deteriorating, ferment and segregate during normal storage conditions and usage. Stability of toothpaste can be tested when it is exposed to $45 \pm 20^\circ\text{C}$ for a period of 28 days. After storage, no phase

separation, fermentation and gassing can be observed. Also exposed to cool conditions such as 50C for 1 hour, no obstruction of extrudableform from the container is observed.

8.Extrudability

In this method, the formulated paste was filled in standard capped collapsible aluminum tubeand sealed by crimping to the end. The weights of tubes were recorded. The tubes were placed between two glass slides and were clamped. 500g was placed over the slides and then cap wasremoved. The amount of the extruded paste was collected and weighed. The percent of the extruded paste was calculated.

9.Foamability

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.

III. RESULT AND DISSCUSSION

Physical Examination: -

Parameters	Observations	Parameters	Observations
1.		Colour	Greenish
2.		Odour	Characteristic
3.		Taste	Characteristic
4.		Smoothness	smooth

Evaluation results: -

Sr.No	Parameters	Observations
1	pH	7.2
2	Homogeneity	Good
3	Abrasiveness	Good
4	Foamability	10ml
5	Moisture content	15%
6	Extrudability	90.38
7	Spreadability 3.5 cm/sec	3.5 cm/sec
8	stability	Stable

IV. CONCLUSION

Herbal toothpaste shows the good action to maintaining the dental caries and oral hygiene.The herbal toothpaste shows the safer minimum side effects. The formulated herbal toothpastes is evaluated by different tests like Physical Examination, pH determination, Homogeneity, Sharp and edge abrasive particles, Determination of moisture and volatile matter, Spreadability, Stability study, Extrudability etc Extrudability: -

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