

Formulation and Evaluation of herbaltoothpaste

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ABSTRACT

Herbal medications for healthcare are becoming more and more popular worldwide. Because they prevent cavities and other dental issues, herbal tooth pastes made of natural ingredients are currently thought to be a more acceptable oral hygiene option than chemical or synthetic formulations. Herbal toothpastes are used to treat dental cavities, tartar, periodontal damage, foul breath, and gum disease. The crucial step in creating a stable and functionally effective herbal toothpaste is getting rid of all the artificial ingredients that are typically added to these kinds of formulations. Toothpaste containing herbs has drawn a lot of interest as a gingivitis reducer. The effectiveness of these toothpastes has been the subject of conflicting studies. It seems that herbal toothpaste works equally as well as non-herbal toothpaste. For individuals who wish to reduce the number of chemicals that can be harmful to both oral and general health, organic toothpaste is a wise and healthier option. This article offers a general overview of the antibacterial and anti-inflammatory properties of several herbs that are utilized as formula excipients and toothpastes.

KEYWORDS: Herbal toothpaste, phytochemical analysis, anti-bacterial, anti-inflammatory activity, gingivitis.

I. INTRODUCTION:

The dentin, pulp, enamel, and root make up a tooth's anatomical components. Gum disease, tooth decay, and foul breath are common dental issues that have an impact on oral health. A stable clinical state and minimal periodontal inflammatory change in the peripheral gingival tissues are the results of maintaining microorganism management and dynamic balance, typically between the periodontal micro flora and the host, in order to maintain oral health (1).Between 300 and 500 BC, toothpaste was first manufactured and developed in China and India. Back then, teeth could be cleaned with abrasives

such as crushed egg, pressed bone, and shells (2). The 19th century saw the development of modern toothpaste products. The primary purposes of toothpaste are to clean, preserve, and enhance dental health. Its main purpose is to encourage good oral hygiene. Moreover, it serves as an abrasive to help keep food particles and plaque off teeth. It releases active substances like fluoride to help prevent tooth decay and gum problems (eg gingivitis), and it helps disguise or remove halitosis. using the aid of toothpaste's additives, the majority of cleaning is accomplished mechanically using a toothbrush (3, 4).In addition to helping to prevent tooth decay and gingivitis, which can result in more serious dental issues, toothpaste typically helps to maintain the health of teeth. After brushing, the toothpaste, which comes in a variety of tastes, keeps your breath and mouth fresh. The chemicals in mouthwashes and toothpaste can have negative effects on teeth color, flavor, or even trigger hypersensitivity reactions. Therefore, the main requirement of the modern world is the use of natural ingredients in toothpaste that do not contain artificial flavors, sweeteners, or preservatives. In addition to antimicrobial ingredients, commercial toothpastes on the market also include compounds including triclosan, propyl paraben, and sodium lauryl sulfate (SLS). To enhance the toothpaste's antibacterial properties, allergens are also added (6). The usage of dental pastes infused with herbs is becoming more popular as a way to avoid all the issues related to chemical-based pastes. One of the most crucial aspects of oral health care is the use of herbs, including herbal toothpastes, which have been utilized since ancient times (7)–(8).



II. MATERIAL AND METHOD:

Various substances are used to produce herbal toothpaste, such as clove oil as a dental painkiller and fenureek powder for its anti-inflammatory properties. Neem powder's antibacterial qualities, Aloe vera gel's ability to fight infection due to its antifungal, antiviral, and anti-inflammatory properties, Trikatu powder as an antimicrobial and anti-carrying agent In order to extract the anti-fungal, anti-inflammatory, and other properties from the peel of pomegranates, a mixture is prepared using a base that includes calcium carbonate as an abrasive, sodium fluoride as an anti-carrier, sorbitol as a humectant, sodium lauryl sulphate as a detergent and foaming agent, sodium CMC like a binding agent, sodium benzoate and methylparaben as preservatives, sodium saccharine as a sweetener, and peppermint oil as a flavoring agent. This created formulation and commercially available herbal toothpaste are contrasted and assessed.

MATERIAL:

The weight of each component was determined by reviewing earlier research on the manufacturing of herbal toothpaste. Since all of the ingredients together have a percentage by weight of 100%, the total amount of toothpaste will result in a formulation of 100 grams of toothpaste. The marketable herbal tooth pastes example

PatanjaliDantKanti, Dabar Red, Colgate Vedshakti, and DaburMeswak were used; the contents of all toothpaste formulations are listed in Table (9).

MECHANISM OF FORMULATION:

There are following two types of methods of the manufacturing of herbal Toothpastes-

1. Dry gum method
2. Wet gum method

Dry Gum MethodG:

Base Preparation -

1. The following solid compounds were precisely weighed in accordance with the formula: calcium carbonate, sodium fluoride, sodium CMC, methyl paraben, sodium benzoate, SLS, and sodium saccharine. Sieved through sieve no. 80 to maintain the particle size.
2. In addition, these substances were mixed in a mortar and pestle and then triturated with precisely weighed sorbitol to make a semisolid mixture. Including herbal compounds
3. Clove oil, aloe vera gel, and precisely weighed powdered herbal extract were added to the base after sieving.
4. At the last end, peppermint oil was added for flavor. (12)

Making of herbs powder-

- Rinse the black pepper, babul leaves, and neem leaves under running water.
- Dry the herbs in shade with exposure to sunlight for two or three days after washing.
- The herbs are ground individually in a grinding mill once they have dried.
- The herbs ought to be finely ground.
- Herbal toothpaste review and comparison.
- Following that, the powder is run through an 80.0% sieve.
- Store in a container that is tightly closed [7].

Composition: -

Every ingredient needs to meet Indian regulations. Toothpaste does not include mono- or disaccharides like sucrose or carbohydrates that can ferment.

Composition table of herbs- (12)

Sr.N.	Ingredients	Quantity in gram	Application
1.	Neem'S leaves	0.5	Antibacterial
2.	Black Peper	0.5	Antioxidant
3.	Babul's leaves	0.5	Astringent
4.	Clove oil	0.5	Anti- inflammatory
5.	Turmeric	0.5	Colourings agent
6.	Pippermint oil	0.5	Flavouring agents

Composition Table of chemical-(12,16,21)

Sr. .N	Ingredients	Quantity (gram)	Use
1.	Calcium carbonate	4.0	Abrasive
2.	Salt	0.5	Abrasive
3.	Camphor	0.5	Antiseptic
4.	Sodium lauryl sulfate	0.5	Foaming agent
5.	Methyl paraben	0.5	Preservative
6.	Water	Q.S.	Vehicle

Evaluation of Toothpaste-

1.Physical Examination of Toothpaste:

The color of the toothpaste formulation was assessed and verified visually . One might detect the product's odor by smelling it. By manually tasting the formulation, taste was verified. By rubbing the paste formulation between the fingertips, the smoothness was evaluated. (9,10)

2.Inertness of tube:

Under typical storage circumstances such as heating at 45±2 C for ten days, the herbal toothpaste container did not experience any corrosion or deterioration. By cutting the inside surface of the tube, opening it, and looking for any signs of deterioration or chemical reactions within the container, the inertness of the tube was determined. (22,23)

3.pH:

10 grams of toothpaste should be dispensed from the container into a 50 milliliter beaker. 10 milliliters of recently boiled and cooled (at 27 degrees Celsius) water should then be added to create a 50% aqueous suspension. Give it a good stir to ensure a complete suspension. Using a PH meter, find the suspension's PH within five minutes. (29)

4.Homogeneity:

The toothpaste will come out of the collapsible tube or any other suitable container as a homogenous mass when normal force is applied at $27\pm 20^{\circ}\text{C}$. Before being gently rolled, most of the contents must also emerge from the crimp of the container. (13,11)

5.Determination of sharp and edge abrasive particles:

To verify for the presence of any sharp or abrasive particles, the contents were placed on the finger and scraped across the butter paper for a length of 15-20 cm. carried out the identical procedure ten times or more. There were no sharp or edge-abrasive particles discovered. (14,16)

6.Foamabilitytest :

The method used to measure the foaming power (also known as foamability) of herbal toothpaste involved adding 2 grams of toothpaste to 5 milliliters of water in a measuring cylinder, noting the initial volume, and shaking the mixture ten times. The total amount of foam was recorded.(23)

7.Determination of moisture and volatile matter:

porcelain dish with a diameter of approximately 6-8 cm and a depth of 2-4 cm was filled with 5 grams of herbal toothpaste to measure the moisture content and volatile matter. dried at 105°C in an oven. (13,18)

Calculations:

$100 \text{ ml} / \text{m} = \% \text{ by mass}$

MI: Mass loss (g) while drying

M: The mass (g) of the test-related substance.

8.Determination of Spreadability:

The spreadability approach involves determining the paste's drag and sliding characteristics. Weighing out one to two grams of herbal toothpaste, we sandwiched it between two 10-by-10-cm glass slides (sliding is not allowed) and pulled the slides in opposing directions. After three minutes, measure the toothpaste's spreading (in centimeters). Performing the experiment again and recording the three readings' average value. (24,21)

9.Anti-Microbial Activity:

A pathogenic bacterium strain E coil was used in an in-vitro anti-bacterial research of the prepared paste using the disc diffusion method and soybean casein digest medium. At first, the cultivated cells in the agar plates tended to multiply. The inoculum was first streaked onto the plates, then sterilized cork borer was used to make 5 mm diameter holes in the medium. To guarantee that the inoculums surrounding the bore were distributed equally, the agar plate's surface was rotated. Next, the commercial formulations and the prepared paste were put into the bores on the cultured plates. The plates underwent a 24-hour incubation period at 37°C after being labeled and encased in paraffin. Every plate was inspected following a 24-hour incubation period. The zone of inhibition's (ZOI) diameter.(39,34)

III. RESULT AND DISCUSSION:

According to the guidelines provided by the Bureau of Indian Standards IS 6356-1993 for herbal toothpaste samples (Vedshakti, Dabur Red, Patanjali, Dantakanti, Meswak, and Formulated toothpaste sample), the evaluation tests for the formulated herbal toothpaste were conducted. Every sample complied with BIS and was determined to be of high quality.

Evaluation experiments for formulated herbal toothpaste were conducted to compare various qualities between marketed and formulated herbal toothpastes. Tables contained all of the evaluation results for the parameters. In the current investigation, the created herbal toothpaste performed comparably, and very seldom did it perform better than the herbal toothpastes that were advertise.(31,33)

PHYSICAL EXAMINATION-(13,29)

Sr.N.	Parameter	Observation
1.	Test of Colour	Greenish
2.	Test of Odour	Characteristic
3.	Taste	Characteristic
4.	Smoothness	Smooth

EXTRUDABILITY-(12,16)

Sr.N.	Extrudability	Mean of tree tube
1.	Net wt. of Formuation in tube (g)	13.5
2.	Wt. of toothpaste extruded (g)	12.2
3.	Extrudability amount percentage	90.30

EVALUATION PARAMETER -(18,26.27,)

Sr.N.	Parameters	Observation
1.	PH determination	7
2.	Homogeneity	Good
3.	Abrasiveness	Good
4.	Nature of Foamability	10 ml
5.	Moisture content	15 %
6.	Extrudability	90.37
7.	Spreadabiity	3.5 cm/sec

8.	Stability of compound	Stable
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IV. CONCLUSION:

The present study's results enable the following deduction to be drawn. Compared to chemical-based synthetic toothpaste, this herbal toothpaste is less harmful and safer. It is also crucial for maintaining dental hygiene and guarding against cavities in the mouth. Every toothpaste product manufactured in a lab and available on the market that contains herbs has been evaluated and compared to the requirements set forth by the Bureau of Indian Standards. Formulated toothpaste can maintain oral hygiene and dental health by having antibacterial activity against microorganisms like *E. coli*. The results of the study and comparison with those of commercial herbal toothpaste formulations demonstrate that the herbal toothpaste formulations (Colgate Vedshakti, DaburMeswak, PatanjaliDantkanti, and Dabur red) are equally intriguing and advantageous.

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