Formulation and Evaluation of Poly Herbal Tooth Paste

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Authors’ contributions
This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information
DOI: 10.9734/JPRI/2023/v35i197396

ABSTRACT
Oral hygiene can be maintained throughout the day by using various dentifrices prepared with herbal and synthetic ingredients. Oral hygiene is maintained to keep the mouth fresh and avoid tooth decay. The largest producer of healthful herbs is India which is known as the botanical garden of the world. The main aim of this work is to formulate and evaluate polyherbal toothpaste and compare it with marketed products of the same category. The toothpaste was prepared by using several herbal ingredients which show antibacterial, antiseptic, and cooling properties. Neem, clove, babool, banyan, amla, and many other natural products are used to formulate ideal herbal toothpaste which satisfies all the required properties to keep the mouth fresh and to prevent tooth decay caused by the bacteria. The method which is used for formulating the herbal toothpaste is the trituration method. The prepared toothpaste was evaluated for its organoleptic and physical characteristics such as color, odor, taste, stability, foamability caused by bacteria, and abrasiveness to ensure that it possesses all the desired features to use against dental disease. Thus, the formulated herbal toothpaste was a good herbal toothpaste than the conventional toothpaste due to its side effect.

Keywords: Poly herbal; toothpaste; formulation.
1. INTRODUCTION

A paste or gel dentifrice which is used to clean and maintain aesthetics and health of teeth with the help of a toothbrush is called toothpaste [1,2,3,4,5]. It is said to be dentifrice that is in the form of smooth semisolid homogeneous mass containing surfactant, binders, polishing agent, humectants, abrasives, and other appropriate materials to maintain oral health [6,7,8,9]. "GOOD APPEARANCE AND IMPRESSION" which gives confidence to an individual is an important key to maintain oral hygiene [10,11,12]. Nowadays people are more inclined towards the use of non-alcoholic and herbal formulation because it does not contain artificial color, flavor, or fluorides as it has several drawbacks [13,14,15]. In ancient days various regions of the world used powdered ashes, eggshells, myrrh, crushed ostrich, crab shell, bones, and the horn of various animals [16,17,18]. During that period they attained good abrasives action with their formulated tooth powder which was further converted into toothpaste [19,20,21]. Proper oral hygiene should be maintained otherwise it will cause several dental problems like cavities, tooth sensitivity, calculus, and periodontal disease [22,23,24]. Herbal toothpaste is referred to as an oral hygiene product to maintain the health of teeth [25,26].

Fig. 1. Herbal ingredients used for healthy teeth

Mostly it contains plant products or its derivatives which it mean for the protection of teeth and is used in strengthening the teeth without causing any harmful effects [27,28]. Natural or herbal toothpaste lack triclosan or fluorides and other artificial chemical ingredients which overcome the side effects like carcinogenic action as it mostly contains plant-based ingredients such as lemon, eucalyptus, rosemary, chamomile sage, and myrrh [29,30].

2. MATERIALS AND METHODS

A method used for the formulation of herbal toothpaste is homogenization by using mortar and pestle for the formation base of toothpaste.

All the required materials for making the herbal toothpaste were collected [31,32].

Each ingredient was dried completely and powdered [33,34].

The powdered herbal ingredient was weighed accurately as per the need [35,36].

The ingredients were mixed with chemicals such as polyethylene glycol is used as humectant and a solvent to form a base for the preparation [37,38].

The herbal powder and the base ingredients were added to the mortar and pestle, and stevia powder was added as a sweetening agent [39,40].

The herbal ingredients are triturated well until a paste consistency is formed [41,42].

2.1 Formulation

An equal proportion of all the ingredients (Neem, Babool, Guava leaf, Banyan, Clove, Betel Nut, Amla, Cardamon, and Stevia) were dried and converted into powder [43,44].

Along with the herbal powder add a sufficient quantity of Polyethylene glycol, water, and sodium lauryl sulfate and mixed well to get the herbal toothpaste [45,46].
3. RESULTS AND DISCUSSION

The sensory evaluation parameters of herbal toothpaste is evaluated their color, odour, taste and observe dark brownish, heavy aromatic, spicy, bitter, and subtly sweet is described in the below (Table 1).

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Parameters</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Color</td>
<td>Dark Brownish</td>
</tr>
<tr>
<td>2.</td>
<td>Odor</td>
<td>Heavy Aromatic</td>
</tr>
<tr>
<td>3.</td>
<td>Taste</td>
<td>Spicy, Bitter, and subtly sweet</td>
</tr>
</tbody>
</table>

3.1 Comparative Study

3.1.1 Formulated herbal toothpaste with marketed formulation (Colgate vedshakthi)

The formulated herbal toothpaste was compared with the marketed preparation for its color, taste, odor, consistency, smoothness, abrasiveness, moisture content, foaming test, fineness test, stability, PH determination, spreadability, and homogeneity.

The consistency, smoothness, and abrasiveness is evaluated and observed and described in the below (Table 2).
Table 2. Sensory evaluation parameters (Consistency, Smoothness, Abrasiveness)

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Parameters</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Consistency</td>
<td>Good</td>
</tr>
<tr>
<td>2.</td>
<td>Smoothness</td>
<td>Moderate Smooth</td>
</tr>
<tr>
<td>3.</td>
<td>Abrasiveness</td>
<td>Good Abrasive</td>
</tr>
</tbody>
</table>

The evaluation test of Ph, Foamability, Moisture content, spreadability, Homogeneity, Stability is observed and described in the below (Table 3).

Table 3. Sensory evaluation parameters (PH, Foamability, Moisture Content, Spreadability, Homogeneity, Stability)

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Parameters</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>PH</td>
<td>7.09</td>
</tr>
<tr>
<td>2.</td>
<td>Foamability</td>
<td>60(100%)</td>
</tr>
<tr>
<td>3.</td>
<td>Moisture Content</td>
<td>34.8 %</td>
</tr>
<tr>
<td>4.</td>
<td>Spreadability</td>
<td>5.8 cm/sec (good)</td>
</tr>
<tr>
<td>5.</td>
<td>Homogeneity</td>
<td>Good</td>
</tr>
<tr>
<td>6.</td>
<td>Stability</td>
<td>Stable</td>
</tr>
</tbody>
</table>

3.2 Physical Examination

The physical examination of the formulation of herbal toothpaste is compared with marketed formulation and is described in the below (Table 4), (Table 5) and (Table 6).

Table 4. Physical examination of formulation 1

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Parameters</th>
<th>Formulation</th>
<th>Marketed Formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Color</td>
<td>Dark brown</td>
<td>Light Brown</td>
</tr>
<tr>
<td>2.</td>
<td>Odor</td>
<td>Heavy aromatic</td>
<td>Aromatic</td>
</tr>
<tr>
<td>3.</td>
<td>Taste</td>
<td>Spicy, bitter, and subtly sweet</td>
<td>Sweet</td>
</tr>
<tr>
<td>4.</td>
<td>Consistency</td>
<td>Good</td>
<td>Good</td>
</tr>
</tbody>
</table>

Table 5. Physical examination of formulation 2

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Parameters</th>
<th>Formulation</th>
<th>Marketed Formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>PH</td>
<td>7.09</td>
<td>9.44</td>
</tr>
<tr>
<td>2.</td>
<td>Good Abrasive</td>
<td>Good Abrasive</td>
<td>Moderate abrasive</td>
</tr>
<tr>
<td>3.</td>
<td>Homogeneity</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>4.</td>
<td>Smoothness</td>
<td>Moderate Smooth</td>
<td>Very smooth</td>
</tr>
</tbody>
</table>

3.3 Physiochemical Evaluation

Table 6. Physiochemical evaluation of parameters

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Parameters</th>
<th>Formulation</th>
<th>Marketed Formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Foaming test</td>
<td>60 (100%)</td>
<td>70 (100%)</td>
</tr>
<tr>
<td>2.</td>
<td>Fineness</td>
<td>Moderate Good</td>
<td>Good</td>
</tr>
<tr>
<td>3.</td>
<td>Moisture Content</td>
<td>20.65%</td>
<td>12.76%</td>
</tr>
<tr>
<td>4.</td>
<td>Spreadability</td>
<td>5.8</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td>Stability</td>
<td>Stable</td>
<td>Stable</td>
</tr>
</tbody>
</table>

4. CONCLUSION

All the marketed herbal and natural toothpaste are not completely herbs, that contain certain chemical compounds to prevent bad breath and whiten the teeth [47,48]. But, here the formulated herbal toothpaste contains various effective herbs that can be used for total dental and oral
care, without causing any side effects. Evaluation tests for formulated herbal toothpaste were carried out according to the standard specified by the Bureau of Indians [49]. Both sample was founded to be of good quality and have physicochemical properties. It is free from harmful and is economical with good quality [50].

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

11. Wakamama CN et al. The effect of selected toothpaste and microbial fluoro of the mouth of your student; 2014.
13. xxx@stetsonhillsdentist.com
15. Pavan Deshmukh et.al. Formulation, and evaluation of herbal toothpaste compared with marketed preparation; 2017
23. Davari AR et.al. Dentine hypersensitivity; etiology diagnosis and treatment; literature review; 2013.
25. Kuldeep Singh et al. Comparative studies between herbal toothpaste(dantkanti) and non-herbal toothpaste; 2016.
29. Vini menta et al. Efficacy of herbal dentifrice on the prevention of plaque and gingivitis as compared to conventional dentifrice; A systematic review and meta-analysis.
31. Jennifer Archibald DDS Dec 7 2020 Bad breath (Halitosis) written by Healthline editorial team.
42. Abhay et al. Formulation and evaluation of new poly herbal toothpaste for oral care; 2015.
44. Satabai Bhattacharjee et al. Efficacy of toothpaste on bacteria isolated from the oral cavity; 2018.
50. Abubakar EL-Ishaq et al. The role of various toothpaste in the reduction of bacteria load in the mouth; 2015.