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FORMULATION AND PHYTOCHEMICAL EVALUATION OF ACMEILLA CILIATA TOOTH PASTE

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ABSTRACT

This study looked at the importance of oral hygiene on a global scale, highlighting the crucial function toothpaste plays in maintaining the health and aesthetic appeal of teeth. This research goes beyond the traditional emphasis on removing plaque and debris; taking into account other aspects including using active substances to prevent gum disease and tooth decay and fight bad breath. This study aimed to compare the effects of conventional toothpaste and herbal products on gum health and tooth enamel roughness. This study's main objective was to assess how herbal toothpaste affected tooth enamel surface roughness and gum health. Because of their beneficial benefits on teeth, herbal toothpastes have gained popularity among professionals and the general population. The effects of conventional and herbal toothpastes on gum health and tooth enamel roughness were compared in this study using a comparative methodology. To assess and quantify these effects, extensive analysis and experiments were carried out. The results of this study will clarify how conventional and herbal toothpastes affect tooth enamel roughness and gum health. This study aims to provide a comprehensive understanding of the potential benefits and drawbacks associated with herbal oral care products in comparison to their conventional counterparts using quantitative data and statistical analyses. Herbal toothpaste is more notable and acknowledged in dental research since it is safer and has less adverse effects than synthetic toothpaste, according to the study's findings. The toothpaste's composition effectively keeps infections at bay and has antimicrobial properties. The preparation of the market in relation to the formulation and dental and oral hygiene.

KEYWORDS

Antimicrobial properties, *Acmella Ciliata*, Herbal toothpastes, Toothpaste's, Dental, Oral hygiene and etc.

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INTRODUCTION

The word "oral cavities" can refer to either a dental cavity (a hole created by tooth decay) or the anatomical oral cavity (the mouth). The lips, tongue, teeth, gums and roof of the mouth make up the oral cavity, which is where the digestive system begins. A dental cavity, which can be painful and necessitate dental care, is a hole in a tooth brought

on by decay. A tooth is made up of a root embedded in the jawbone and a visible crown above the gum line. Dentin makes up the majority of the tooth, with the hard, protective enamel covering the crown. The soft pulp, which contains blood vessels and nerves, is located in the middle of the tooth. The periodontal ligament holds the root to the jawbone while the cementum covers it.

Herbal toothpaste Herbal toothpastes are composed of natural ingredients, some of which are certified as organic. An increasing number of consumers have started to use natural toothpaste to get away from the artificial and synthetic tastes that are sometimes included in traditional toothpaste. These natural toothpastes do not contain artificial flavours or chemicals. They are a good choice for individuals allergic to the foaming chemical sodium lauryl sulphate (SLS), which is frequently included in commercial toothpaste brands, or mint. One herbal toothpaste brand, Vicco, is highly trusted and uses only original herbal ingredients. It is effective in preventing gum diseases and is made from herbal stems and flowers rather than artificial ingredients. Vicco toothpaste also contains Vajradanti, which translates to “diamond teeth,” and does not use any sugar.

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. It shouldn't hurt the oral fluid and tissue
8. It shouldn't discolour teeth.
9. It should taste good and have a pleasant aroma.
10. Should not have any drug resistance that was induced.

Advantages of Herbal Toothpaste

1. Simple 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 be endangered.
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 adequately label substances, including fluoride, which some people find concerning.
4. Long-term use of excessive amounts of fluoridated toothpaste can cause fluorosis. If toothpaste is ingested in any amount continuously, it can be acutely poisonous.

Our objective of this study is to formulate and evaluate herbal toothpaste containing *Acmella ciliata* and study its effect on oral hygiene, tooth enamel roughness, and gum health in comparison with conventional toothpaste.

MATERIAL AND METHODS

Materials

Water, CaCO_3 , clove oil, vegetable glycerin and rock salt, were purchased from the local market. Soxhhold Apparatus, Various polar and non polar solvents used in the extraction. *Acmella ciliata* dried powder was purchased from local ayurvedic shop.

Methodology

Soxehol Extraction

Collected desired plant parts (flower heads are rich in actives) and shade-dry the plant material thoroughly. Grind the dried material into a coarse powder using a mortar and pestle or grinder. Place a 100gm of the powdered plant into a cellulose thimble. Assemble the Soxhlet apparatus, placing the thimble in the extraction chamber and added the solvent (methanol: water 50:50 % v/v) to the round-bottom flask. Heat the flask to boil the solvent. The solvent vapour travel up, condenses, and drips into the thimble, soaking the plant material. When the

siphon tube fills, the solvent, now containing extracted compounds, siphons back into the flask, concentrating the extract. Continue this cycle for several hours (e.g., 8 hours) After extraction, concentrate the extract to dryness (often using a rotary evaporator to remove solvent). Collect the resulting residue (extract) for further phytochemical analysis or functional studies.

Optimized Formulation

Were we tried many formulation in the various ratios but among these best one formulation selected in the bases in the evolution of both physical and chemical properties and optimized formulation given in the Table No.1.

Preparation of Toothpaste Base (Dry gum method)

The solid ingredients calcium carbonate, sodium lauryl sulphate, glycerine, sodium saccharine were weighed accurately as mentioned in the formula and sieved with sieve no.80 so as to maintain the particle size.

These ingredients were also mixed in a mortar and pestle, and then triturated with precisely weighed glycerine until a semisolid substance was created.

Addition of herbal ingredients.

Accurately weighed herbal extract in form of ginger oil were added to the base.

At the end, peppermint oil was added as a flavour.

RESULTS AND DISCUSSION

Herbs and herbal extracts have been proven to be blessings for mankind. Considering the benefits of herbs in therapeutics, including dentistry, we prepared a herbal toothpaste that is thoroughly composed of natural extracts, which are safe for children as well.

Preliminary Phytochemical Analysis

The preliminary photochemical study by tooth paste extracts were performed by the standard general procedure and the results were given in the Table No.2.

Physical Examination of Toothpaste

Colour

The Formulated herbal toothpaste has a Whitish brown colour, which shows the presence of natural ingredients without any chemical colouring agents.

Odour

The toothpaste has a unique odour that is nice & mild, reflecting the natural smell of its plant ingredient.

Taste

The toothpaste has a unique taste that is acceptable, without the fake sweetness or bitterness found in some synthetic toothpaste.

Threading Property

The threading property of toothpaste is smooth, ensuring an easy and consistent application on the toothbrush and enabling uniform spreading in the mouth.

Quality control Evaluation Report

pH of Toothpaste

The pH of prepared herbal toothpaste is 9.18. This basic pH helps in keeping the mouth environment, possibly lowering the chance of acid-related dental problems such as tooth loss and damage.

Homogeneity

The toothpaste shows good homogeneity, suggesting that chemicals are well-mixed and evenly spread throughout mixture. This regularity ensures each treatment offers same healing benefits.

Abrasiveness

The toothpaste has good abrasive power, which is important for successfully cleaning teeth plaque and surface spots without causing damage to enamel. This balance is important for keeping mouth health and avoiding tooth caries.

Foamability

The foam height was tested at 1.5cm. Adequate foamability is important as it helps in the spread of toothpaste throughout the mouth, ensuring all areas of teeth are cleaned effectively.

Moisture content

The moisture content of toothpaste is 9.6%. This amount of wetness ensures that toothpaste stays flexible and easy to apply while also keeping its stability over time.

Fineness

The toothpaste is described as fine, meaning it has a smooth structure without any gritty bits. This quality improves user experience by giving a nice taste and ensuring soft yet effective cleaning.

Table No.1: Optimized formulation of toothpaste for 100gm

S.No	Ingredients (gm)	Quantity (% w/w)
1	Herbal Extract (<i>Acmella ciliata</i>)	5.0gm
2	Sodium Lauryl Sulphate	8.0gm
3	Sodium Benzoate	8.0gm
4	Camphor	2.0gm
5	Honey	2.0gm
6	Calcium Carbonate	40.0gm
7	Glycerin	30.0gm
8	Sodium Chloride	5.0gm
9	Distilled Water	Q.S

Table No.2: Preliminary phytochemical analysis

S.No	Phytochemical test	Result
Test for carbohydraes		
1	Molisch's Test	Positive
2	Benedict's Test	Positive
3	Fehling's Test	Positive
4	Barfoard's Test	Positive
5	Iodine test (test for Carbohydrate)	Positive
Tests for proteins and amino-acids		
6	Ninhydrin test	Negative
7	Biuret test	Negative
8	Xanthoprotein test	Negative
9	Tannic acid test	Negative
Test for alkaloids		
10	Dragendorff's Test	Positive
11	Mayer's Test	Positive
12	Wagner's Test	Positive
13	Hager's Test	Positive
Test for flavonoids		
14	Ferric chloride test	Positive
15	Fluorescence test	Positive
16	Alkaline test	Positive
Test for tannins		
17	Potassium ferric-cyanide test	Positive
Test for phytosterols		
18	Liebermann Burchard test	Positive
Test for saponons		
19	Frothing test	Negative
20	Test for quinones	Positive
21	Test for anthocyanins	Positive

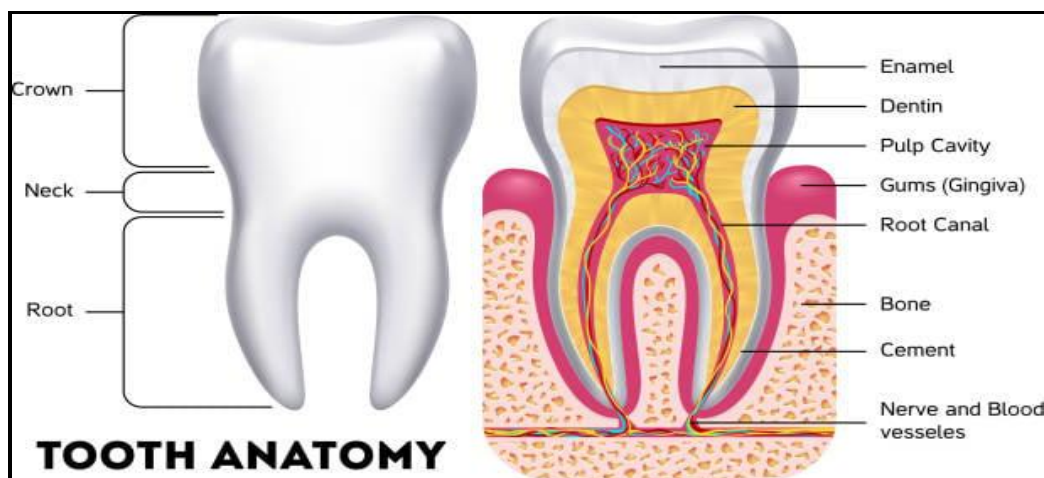


Figure No.1: Anatomy of tooth

CONCLUSION

The potency of herbal products can vary; therefore, caution should be exercised when selecting them. In dentistry, herbs such as are useful. Further research is needed to determine whether herbal remedies are effective alternatives to current treatments for oral health problem. The Formulated herbal toothpaste showed encouraging outcomes in terms of safety and effectiveness, and it could have several benefits over toothpastes prepared traditionally. Our investigation revealed that toothpaste exhibited excellent physical properties, including a uniform beige color, a distinct flavor and odor and smooth threading ability. It is composed of natural substances such as neem, liquorice, banyan tree root, strawberry and other natural oils. Upon examining many aspects, the following findings were highlig 9.18, which is in line with keeping teeth healthy. The product has the right amount of foaming power to clean well, as seen by its 1.5cm were assured at 9.6% moisture content. Strong grinding power is essential for getting rid of tooth plaque and stains and this combination showed it. The study was limited to a single batch, and more thorough testing with larger sample quantities is needed to generalize results. In addition, lack of comparison group using synthetic toothpaste and any errors in reviewer testing might affect overall assessment of effectiveness of plant formulation.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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