



A RESEARCH ON: PREPARATION AND EVALUATION OF HERBAL TOOTHPASTE

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ABSTRACT

The Majority of people use toothpaste regularly. Typically the toothpaste is used to clean the mouth and teeth. It also used to treat variety of dental conditions. Here many dentists advise using herbal toothpaste to cure condition including toothpaste sensitivity & chronic gingivitis among others. For making Herbal toothpaste certain test can be done. In the laboratory like PH, viscosity test, determination of abrasive particle foamability. In this Herbal toothpaste natural Ingredients are used like neem leave, guava leaves, kalmi bark, babul leaves extract, lemon oil extract, ginger extract etc. These are used in herbal toothpaste formulation, and also some main ingredients are also used for formulation of herbal toothpaste like Camphor, honey, calcium carbonate, glycerin, sodium Lauryl sulphate, Methyl paraben, Sodium Chloride, distilled water, etc. This many ingredients are taken from the Nature. It all has the Antibacterial Effect. The toothpaste formulated which can satisfy all the required Condition to keep mouth fresh and prevent tooth decay by Bacteria, gums problem unwanted smell of mouth, and also teeth related problem.

KEYWORDS: Oral hygiene, Marketed Herbal Toothpaste, Natural ingredient, Anti-microbial activity, Comparison and evaluation.

INTRODUCTION

Herbal and Herbal based toothpaste has been used since many years ago in Ancient time and is one of the most important component of oral health care. The toothpaste were manufactured and develop in China and India from 300-500 BC. During that utilized period, squashed bone, pulverized egg, and calm shells were utilized as abrasive as a part of tooth cleaning. Modern toothpaste is used to clean, preserve and enhance the health of teeth. The primary purpose of toothpaste is to encourage oral hygiene. The term "Herbal Medicine" refers to the use of any plant material for therapeutic and disease treating purpose. Herbal remedies have been used extensively throughout the human history and world health organization (WHO) estimate that around 80% of people used Herbal Toothpaste remedies as their primary form of healthcare. It has been shown that over 35,000 plant species are employed for medicinal purposes in numerous societies around the globe. Some of them have strong antibacterial, Antiviral, Anticancer and Antifungal properties. A time tested and significantly validated herb. Neem is renowned for its Antimicrobial, Anti-inflammatory, Soothing and health properties, which are extremely therapeutic for oral health and hygiene. It has been observed to be as good sodium hypochlorite effective Antimicrobial, commonly used in dental preparation. The 100% safe & effective herbal dental preparation,

efficiently maintains dental hygiene, heals oral ulcers, strengthens the gums, brightens the teeth and endows fresh and clean breathing.^[1]

BENEFITS

Herbal toothpaste is a wise and healthier choice for those, who would like to minimize the amount of chemicals that could potentially endanger general health. Herbal toothpaste contained natural Antibacterial ingredients such as spearmint and peppermint oils. This help to eliminate bacteria and keep our mouth healthy.

OBJECTIVE

- ☐ It is used to treat many disease related to teeth.
- ☐ Many dentist recommended to use toothpaste to treat disorder like sensitivity, chronic gingivitis etc.
- ☐ Herbal toothpaste can be prepared using different herbal extract of many crude drugs having Antibacterial, Antimicrobial Activity.^[1]

EFFECT OF HERBAL TOOTHPASTE

- ☐ To remove dental plague.
- ☐ To stimulate appetite, to provide a sense of well being.
- ☐ To maintain the healthy state of mouth, gums, and teeth.

- To prevent gum inflammation and infection.^[1]

ADVANTAGES

- Simple to use.
- Fluoride may be present to prevent cavities.
- Sodium lauryl sulphate, can irritate and inflame the gums while
- Brushing. But there are no chemical ingredients in herbal toothpaste.
- Herbal toothpaste is beneficial for the teeth, mouth, or teeth □ Related any problems.
- Natural oral care product work well to get a rod of bacteria and □ Maintain a healthy mouth.
- Herbal toothpaste contains peppermint and spearmint oils,
- Which aid in killing bacteria.

DISADVANTAGES

- It shouldn't include cinnamon or any Synthetic chemical or dyes.
- More Sugar content toothpaste cause harm to teeth
- Some toothpaste ingredients cause ulcers or rashes or redness
- And swelling around the mouth or on a tongue.^[2]

IDEAL PROPERTIES

- Strong abrasive action.
- It shouldn't discolour teeth.
- It should be non -toxic and non irritating.
- It should taste good and have a pleasant aroma.
- Maintain a healthy and clean mouth.
- Leaves no stains on the teeth.
- Long lasting impact.
- Accessible and Affordable.
- It shouldn't hurt the oral fluid and tissue.

PLANT PROFILE

NEEM LEAVES

Botanical name:- Azadirachta indica A.

Family:- Meliaceae.- Neem is a member of mahogany.

Synonyms:- Azadirachta indica, commonly known as neem , margosa, nimtree or Indian lilac.



Fig. 1: Neem leaves

Chemical composition:- The chemical constituents are found in the leaves of neem as nimbin nimbanenel, nimbandiol, ascorbic acid and amino acids.

Therapeutic uses:- Azadirachta indica has Antifungal and antibacterial properties regular brushing with neem contains toothpaste will reduce the deposition of plague, prevent caries and enhance the immune response for overall oral health.^[3]

GUAVA LEAVES

Botanical name:- psidium guajara L.

Family :- Myrtaceae.

Synonyms:- They are dark green, oval, Peru and characterize by their obtuse type apex.



Fig. 2: Guava leaves

Chemical Composition:- (31) reported the approximate composition of guava leaves

82.47% moisture, 3.64% ash, 0.62% fat, 18.53% protein, 12.74% carbohydrates, 103 mg of ascorbic acid (vitamin C), and 1,717 mg of total phenolic compounds [mg of gallic acid equivalents (GAE)/g].

Therapeutic Uses:- it has several antibacterial, anti-cancer, anti-diabetic, and antioxidant properties in its leaves. Guava leaf extract has long been utilised for its therapeutic properties. The primary goal of this research is to use the herbal component to create toothpaste that can efficiently remove oral germs.^[3]

MATERIAL AND METHODS

Formulation of herbal Toothpaste is prepared by using different ingredients like Fenugreek powder for its Anti-inflammatory, clove oil as a dental Analgesic, Neem powder which shows Antimicrobial property.

The weight of every ingredient was decided by review previous study formulation of herbal Toothpaste.



Fig. 3: Materials & Methods

MATERIALS

The weight of every ingredient was decided by review previous study Formulation of herbal Toothpaste. The ingredients which are used here is, neem leaves, guava leaves, kalmi bark, babul leaves extract, lemon oil extract etc.

The combination of percentage by weight of all the ingredients this is 100% which means sum of the quantity of herbal toothpaste will be formulate 100gm of toothpaste formulation. The toothpaste which are used in marketed are patanjali, DantKanti, Dabor Red Colgate etc.^[4]

Table 01: API in Herbal Toothpaste.

Sr.No.	Ingredients	Quantity in gm	Uses
1.	Fenugreek Powder	2.5 gm	Anti- inflammatory
2.	Neem Powder	0.05 gm	Anti- microbial
3.	Clove Oil	0.02 gm	Dental Analgesics
4.	Aloevera gel	6 gm	Anti-fungal, Anti-viral, Anti- inflammatory
5.	Pomegranate peel	1.6 gm	Anti- fungal, Anti- inflammatory

Table 02: Base in Herbal Toothpaste.

Sr.No.	Ingredients	Quantity in gm	Uses
1.	Calcium Carbonate	41 gm	Abrasive
2.	Sodium fluoride	0.9 gm	Anti-caries agent
3.	Sorbitol	44 gm	Humectants
4.	Peppermint oil	q.s.	Flavouring agent
5.	Sodium lauryl Sulphate	1.5 gm	Detergent and Foaming agent

METHOD OF FORMULATION

There are two types of methods which are used in the formulation of herbal Toothpaste.

1. Dry gum method.
2. Wet gum method

DRY GUM METHOD

Ingredients such as calcium carbonate, Sodium fluoride, Methyl paraben, sodium benzoate are weighed accurately and is mentioned in formula and it carry out in sieve no. 80.

Further, this chemical which we have taken are subjected to mix together in Mortar and pestle and triturated until semi-solid mass formed.

Accurately weighed the herbal extract in the form of powders were sieved and added to base along with clove oil and Aloevera gel At last after the mixture has almost done then add peppermint oil as flavouring agents.

WET GUM METHOD

In this method, the binding agent is then mixed with the liquid phase with uniform stirring .in order to form mucilage.

The solid ingredients excluding the surfactant are then gradually added to the mucilage with uuniform mixing in an agitation mixer, in order to form a homogeneous past.^[5]



Fig 04: Prepared Herbal Toothpaste

Table 03: Composition.

Sr.No.	Ingredients	Quantity in gm
1.	Neem steam & Bark	0.5 gm
2.	Babul leaves	0.5 gm
3.	Guava leaves	0.5 gm
4.	Camphor	0.5 gm
5.	Honey	0.5, 1.1, 1.5 gm
6.	Sodium Chloride	0.2 gm
7.	Sodium lauryl Sulphate	0.5, 1.1, 1.5 gm

OVERALL PREPARATION

- Firstly, we collect the Neem and guava leaves. Then after collection of leaves
- Dry them in pharmaceutical lab for 4-5 days. After that by using a grinder crush them.
- After grinding the powder form of leaves is formed.
- Weigh the quantity of each and every chemical by using a weighing balance.
- Now, mix the guava and neem leaves according to Quantity measure.

- After that mix all the ingredients one by one except Methyl paraben, which is used as a preservative in the Toothpaste.
- If the toothpaste is not thick and add sufficient quantity of water in it count.
- The mixture in container and then add some flavouring agent like peppermint oil and mix well.
- At, last the Toothpaste is ready and store in laboratory.^[6]

Action of Neem leaves extract

Sensitive teeth and gums can be difficult to cure on daily basis, because foods you eat and liquid you drink can cause pain.

So, this guava leaves is help in tooth problems like sensitivity, bleeding gums or mouth.

EVALUATION OF TOOTHPASTE

A. Evaluation/ Physical Examination

- ☐ Colour
- ☐ Taste
- ☐ Odour

B. Physical Characterization

- ☐ PH Determination
- ☐ Foaming ability
- ☐ Homogeneity
- ☐ Content of moisture

C. Rheological properties

- ☐ Spreadability
- ☐ Viscosity
- ☐ Tube Extrudability
- ☐ Relative density
- ☐ Stability study

PHYSICAL EXAMINATION

- o Colour- colour of the Toothpaste was evaluated for its colour. It was checked visually.
- o Taste- It was checked manually by tasting the product.
- o Odour- It was found by smelling the product.

PHYSICAL CHARACTERIZATION

- ☐ Determination of pH:- pH of the formulated herbal toothpaste was determined by using pH meter. Take 10 gm of toothpaste in 150 ml of beaker, Also 10 cc of water added that has been heated and then cool and then stir well in order to create suspension.



Fig 05: pH Meter

- ☐ Foaming ability:- Here in this, the tiny amount of formulation is mix with water. The Foamability of toothpaste formulation is assessed. Measuring cylinder capacity was recorded, i.e. its initial volume was noted. Shaken 10 times. Find the volume of foam was noted.



Fig 06: Foaming Ability

- ☐ Homogeneity:-Here by applying normal force at 27 °c.

The Toothpaste shall extrude a homogeneous mass from the collapsible tube or any suitable container.

If we add bulk amount of content shall be extrude from crimp at container and rolled gradually.

- ☐ Content of moisture:-Weighed toothpaste (10 gm) was placed in a porcelain plate and dried at 105°C in oven. It was desiccated to chill it.



Fig 07: Determination of Content of Moisture

Table 04: % Moisture Content Comparison.

Preparation	% Moisture content
Colgate	15.20%
Dabar Red	26.40%
DantKanti	8.80%
Lab formulation	15.60%

This above table shows that the formulated herbal toothpaste is having equal or near about and ingression passion over the market preparation.

RHEOLOGICAL PROPERTIES

- ☐ Spreadability:- In this the toothpaste was placed on a glass slide and then covered with another glass slide for 5 min to expel air and to provide a uniform film of paste between slides.

The paste should not be comes out from edges of the slide. and then it sees the Spreadability of toothpaste.

Formula of Spreadability

$$S = M \times L / T$$

Where,

S= Spreadability.

M= weight in pan.

L= length moved by the glass

T= time (sec) taken to separate the upper slide from ground slide.

- Viscosity- In this using a Brookfield viscometer. Brookfield engineering labs USA. Each toothpaste formulation viscosity was measured.

The formulation which are study are stored in narrow mouth container, and then spindre of Brookfield viscometer was submerged fir 2 min.

By using Brookfield viscometer with 64 spindle no. And 100 rotation per min.

The viscosity of mfg. Herbal toothpaste was measured.

- Tube Extrudability-The formulation under study was filled in a clean, lacquered aluminium collapsible one ounce tube with a nasal tip of 5mm opening and applies the pressure on tube by the help of finger . The Extrudability was then determined by measuring the amount of paste extruded through tip when pressure was applied on tube paste.

Table 07: Tube Extrudability.

Extrudability	Mean of tree tube
Net weight of formulation in tube (gm)	13.5
Weight of toothpaste extruded (gm)	12.2
Extrudability amount percentage	90.37

Table 08: Uniform Stability.

- At 25°C ± 2° C /60% RH (3rd month)

Colour	Appearance	Spreadability	PH
Greenish Brown	Homogenous	3.5	8.2

- At 30° C ± 2° C /65% RH (3rd month)

Colour	Appearance	Spreadability	PH
Greenish Brown	Homogenous	3.45	7.95

- At 40° C ± 2° C /75% RH (3rd month)

Colour	Appearance	Spreadability	PH
Greenish Brown	Homogenous	3.0	7.50

COMPARATIVE STUDY

Formulated Herbal Toothpaste V/s Marketed Formulation.

- Relative density - Weight in grams was measured using an RD bottle with 10 ml of formulation and 10ml of distilled water. □ Stability study- As, we all know this study was prepared as per ICH guidelines.

The formulated paste was filled in collapsible tube and stored at different temp and humidity condition 25°C +- 2°C. This study period for 3 months and studies for appearance, pH and Spreadability.^[7]

RESULT

Table 05: Description.

Sr. No	Parameters	Observation
1	Colour	Pink
2	Odour	Characteristics
3	Taste	Sweet
4	Stability	Stable
5	Spreadability	Easily spread
7	Abrasiveness	Good abrasive
8	Foamability	Good

Table 06: Physical Examination.

Sr. No	Parameters	Observation
1	PH	8.7 cm
2	Spreadability (cm)	7.7 cm
3	Viscosity (cps)	39751.6 cps
4	Tube Excludability	Good

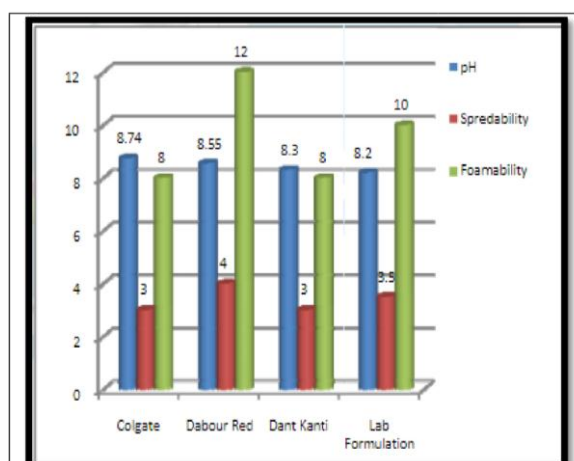


Fig 08: Comparison Between Prepared herbal formulation and Marketed Formulation About pH, Spreadability & Foamability.

DISCUSSION

After overall study of Herbal Toothpaste. We come to know that, the herbal toothpaste Formulation was prepared from neem leaves, guava leaves, cinnamon base,

natural ingredients and small amount of synthetic ingredients. Trist phase of formulation three batches were performed due to problems like homogeneity, Spreadability, and Foamability.

This formulated herbal toothpaste evaluation tests were carried out according to standard specified bureau of Indian standard. Is 63561993 for herbal toothpaste sample (Patanjali, Dant Kanti, Dabur red etc.) The entire sample should found in good quality. Formulated herbal toothpaste evaluation tests were carried out to compare different properties of Formulated herbal toothpaste. All result of evaluating parameters, were given in tables. Nowadays better results found in formulated herbal toothpaste than in marketed herbal toothpaste.

Formulated herbal toothpaste was evaluated visually for its colour i.e yellowish brown. Odour was found by smelling the product.

We found that all the herbal toothpaste is good for the oral hygiene as compared to synthetic toothpaste.

This herbal toothpaste shows the antimicrobial, Anticancer and also many other activities are shown in this herbal toothpaste. Also the toothpaste has good consistency and smooth texture was tested by rubbing the toothpaste.^[9]

CONCLUSION

In conclusion, oral cosmetics, is great example of how discoveries in chemistry are part of our day today lives.

The research concluded that herbal toothpaste is safer than the synthetic toothpaste. This herbal toothpaste is also used for oral hygiene and it shows the antimicrobial activity against pathogens.

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