

Preparation and Evaluation of Herbal Toothpaste

Prof. Sandeep R. Purkar, Mr. Nirbhay Sumatilal Sancheti, Mr. Sushant Sudhir Joshi,

Ms. Harshada Pramod Gharate, Ms. Ekta Nitin Bendale,

Ms. Harshada Vasant Pund, Mr. Kalash Sanjay Tatiya

Gokhale Education Society's, Sir Dr. M. S. Gosavi College of Pharmaceutical Education and Research, Nashik, India

Abstract: Targeted regions in India include the Japanese Chain, Eastern Himalayas, Western Ghats, and Andaman & Nicobar Island. There are 45000 ancient medicinal plant species there. However, only 3000 plants have been officially identified as having potential for health. Practitioners from antiquity employ over 6000. India is the world's top producer of medicinal plants and is known as the "World Botanical Garden." Toothpastes are complicated abrasive and surfactant combinations; anticavity humectants (to avoid dryness and improve the pleasant mouth feel); agents like fluoride; tartar control components; pH buffers; and binders, which give things form and consistency. Natural components in herbal toothpaste are more socially acceptable than Due to their safety, chemical-containing toothpastes are commonly used in oral dental care today. and effectiveness in lowering and effectiveness in avoiding tooth caries and other dental conditions that this Creation is susceptible. We incorporate plant extracts like peppermint oil, ginger oil, and oil, Tulsi oil, clove oil, and neem leaf oil; camphor and honey are also included. These extracts have wound-healing, anti-ulcer, anti-caries, anti-bacterial, and as well as some special qualities like anti-fungal and anti-cancer. Preparing, evaluating, and comparing Lab Made Products is the primary goal of the current activity. Toothpaste with commercial herbal natural toothpaste. During the investigation, commercial The quality of herbal toothpastes like Vicco has been assessed. every marketed Herbal toothpaste manufactured in laboratories and tooth pastes made from herbs that had been tested complied. In accordance with the criteria established by the Bureau of Indian Standards. Detect F-, Pb, As, and stability research. The evaluation of all the parameters revealed that the lab-created formulation is roughly equivalent and hardly ever produces greater results than advertised formulation. Hence It was determined that the chosen Labmade formulation was of high grade.

Keywords: Herbal Toothpaste.

I. INTRODUCTION

Since ancient times, people have used toothpastes, which are now one of the essential and indispensable parts of oral healthcare. From 300 to 500 BC, formulas for toothpaste were developed in China and India. To prevent and/or treat oral illnesses, the emphasis today is on the release of active substances during formulation development. [3] A dentifrice called toothpaste is used to clean, preserve, and enhance the health of teeth.

[8] Toothpaste is primarily used to enhance oral cleanliness and also serves as an abrasive that helps to prevent dental cavities and remove food particles from the teeth, helps to remove and/or mask halitosis, and releases API like fluoride to help prevent tooth and gum disease (eg. Gingivitis).

With the aid of excipients found in toothpaste, the mechanical action of the toothbrush cleans the mouth most of the time. 6–8 Since many herbal formulations contain active chemical ingredients like polyphenols, gums, and alkaloids, they are particularly effective.

Various substances, including glycosides [12]. Various biological processes have also been these compositions have been researched. The primary objectives are to create and test herbal toothpaste.[14].

Dental caries is one of the most prevalent chronic oral infections in the world [1]. Dental plaque, dental caries, as well as gingival and periodontal disorders, have all been linked to oral pathogenic bacteria [3]. One of the primary opportunistic microorganisms of dental caries, *Streptococcus mutans*, is in charge of the development of dental plaque and caries [4]. In addition to *Escherichia coli*, *S. aureus* [5,] and *Candida* species, other microorganisms connected to this oral condition include *Candida* species.

Chemicals like fluoride and whitening chemicals make up the majority of commercial toothpaste formulation ingredients [3]. The harmful effects of fluoride and bleaching chemicals (such those based on peroxide) used in commercial toothpastes have been documented in the literature [6].

The most common yeast found in oral cavities with poor oral hygiene is *C. albicans* [2].

The best qualities for toothpaste are:

- Effective abrasive action
- Non-toxic and non-allergic
- Give teeth no stains
- Keep the mouth healthy and hygienic.
- Extended impact
- Cheap and easily accessible [2]

II. MATERIAL

One formulation of herbal toothpaste is made utilising a variety of components, including Sodium Lauryl Sulfate as a detergent and foaming agent, Glycerin as a humectant, Peppermint Oil as a flavouring component, and Sodium Benzoate as a preservative.

Sodium saccharine serves as a sweetener and a preservative. Moreover, an anti-inflammatory material made of ginger oil is present. Creating herbal toothpaste involves a mortar and pestle homogenization process is used to create the toothpaste base.[7]

Based on the findings of an earlier investigation into the composition of herbal toothpaste, the weight of each ingredient was calculated. This toothpaste's constituents have a total proportion by weight of 100%, meaning that the entire amount of each 50gm of toothpaste formulation will be produced[10]

TABLE I

Ingredients (gm)	Quantity (W/W)%	Role
Guava Extract	8 gm	Anti - bacterial
Acacia Gum	4 gm	Emulsifier
Calcium Carbonate	10 gm	Abrasive
Glycerine	6 ml	Humectant
Sodium Chloride	1 gm	Anti - cavities
Sodium lauryl sulphate	0.5 gm	Detergent
Turmeric	1 gm	Anti - inflammatory
Camphor	0.5 gm	Antiseptic
Honey	0.5 gm	Prevention of dental caries & gingivitis
Peppermint oil	Q.S .	Vehicle

III. EVALUATION OF HERBAL TOOTHPASTE

3.1 Physical Examination

1. **Color:** The colour of the toothpaste formulation was assessed. That toothpaste's colour was examined visually.
2. **Odor:** The product's smell revealed any odour.
3. **Taste:** The formulation was physically tasted to assess the flavour.
4. **Smoothness:** The paste formulation's smoothness was assessed using It is rubbed between the fingers.
5. **Relative Density:** The weight in grammes used to calculate relative density RD bottle evaluation in 10 ml formulation and 10 ml distilled water [2].



Fig.1.1 Physical Examination of Toothpaste

3.2 pH Determination

A pH metre was used to determine the pH of the herbal toothpaste formulation. 150ml of beaker were filled with 10g of toothpaste. Allow 10 millilitres of boiling water to cool before continuing. chilled water In order to create a suspension, stir briskly



Fig. 1.2: pH Determination

3.3 Abrasiveness

Extrude the material onto the butter paper until it is 15-20 cm long, then repeat the repeat for at least ten tubes that collapse. Press it with the entirety of the length with the tip of your finger to check for any sharp or difficult-to-miss abrasive particles. Such particles must not be present in toothpaste formulations.



Fig. 1.3 : Abrasiveness

3.4 Determining Spreadability

This method uses the paste's slide and drag properties. (2g) of prepared paste was applied to the ground slide under investigation. For five minutes, the prepared paste was sandwiched between this glass slide and another. to remove air and to give a consistent paste film between slides. a surplus of the paste was removed starting at the edges. The top plate was then pulled 80 grammes with the assistance of the string linked to the hook and the seconds needed for the topslide to 7.5 cm of coverage were reported. Better spreadability was indicated by a brief interval.

Spreadability was determined using the formula below:

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

Where, S = Spreadability Weight in the pan is M. (tied to the upper slide)

L = The length that the glass slide moved.

T is the duration in seconds needed to separate the top slide from the bottom slide.

3.5 Foamability

The foamability of toothpaste formulations was assessed by combining 2g of toothpaste in a measuring cylinder with 5 ml of water; the original volume was reported and then 10 shakes of the object. The foam's final volume was observed.

How to calculate froth power:

Power of foaming = $V_1 - V_2$

V1: Water and foam volume in millilitres.

V2 : Volume in millilitres of water alone

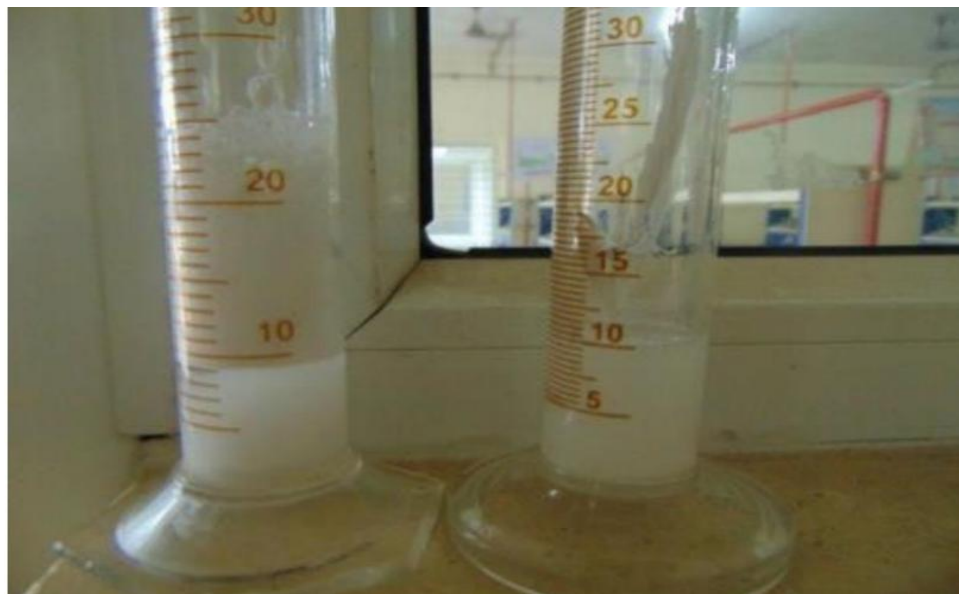


Fig 1.5

3.6 Determination of Moisture and Volatile Matter

To test moisture and volatile matter, 5 grammes of herbal toothpaste were placed in a porcelin dish with a diameter of 6 to 8 cm and a depth of 2 to 4 cm. moisture and combustible materials. It was dried at 105 degrees Celsius in an oven.

3.7 Stability

The ICH guidance was followed when conducting the stability investigation. The A collapsible tube containing the created paste was used to store it at various temperatures. 65% relative humidity between 30°C and 2°C, and 5% relative humidity at 25°C while being studied for three months at 40°C, 2°C, 75%, and 5% RH appearance, pH, and spreadability.

3.8 Moisture Content

A porcelain dish was used to weigh and dry 10 grammes of toothpaste.

Oven temperature: 105 °C.

It was desiccated to chill it. The supplied formula is used to compute the weight loss and record it as a percentage of moisture content.

% Moisture = $\frac{\text{Original sample weight} - \text{dry sample weight}}{\text{Original sample weight}}$

3.9 Fragrance Test

It was based on subjective evaluation of the fragrance's acceptability. 5 people were questioned about the appropriateness of the scent, and their feedback was recorded. Moreover, there was appraised in accordance with the criteria listed below;

A) The smell was excellent, comparable to the fragrance used as a model. toothpaste.

B) The aroma wasn't great, but it was comparable to the standard. toothpaste.

C) The toothpaste's aroma was inferior to that of the standard toothpaste.

3.10 Homogeneity

By exerting normal force, the toothpaste must extrude a homogenous mass from the collapsible tube or any other suitable container. Additionally, the bulk of the contents must protrude from the container's crimp before being gradually rolled [11][12].



IV. RESULT AND DISCUSSION

According to the guidelines outlined by the Bureau of Indian Standards IS 6356-1993 for Herbal toothpaste samples, evaluation tests of toothpaste were conducted (Vicco) and a toothpaste sample created in a lab. All of the samples met BIS requirements and were confirmed to be of high calibre. The various ingredients used in a formulation together with their concentrations oral care products [6].

4.1 Anti-Microbial Activity

Antimicrobial effectiveness was assessed and determined using the well diffusion method using Bauer et al [24]'s standard approach, analyse the activity of the toothpaste. drug utilised in IP-grade ofloxacin and ciprofloxacin were the typical preparations. The ability to combat microbes was carried out using *S. Mutans* and *S. aureus* 24 hour cultures. There were three utilised concentrations are 25, 50, and For each phytochemical that was extracted in studies on antibiograms [13]. The placement of wells with antibiotics on the surfaces of agar is its key component. soon following vaccination with the tested pathogen. cultures grown undiluted in overnight broth never be employed as an inoculum [9]. The plates were incubated for 24 hours at 37 degrees Celsius. subsequently checked for distinct zones of inhibition surrounding the wells that had been impregnated with a specific drug concentration Each well's zone of inhibition (ZOI) diameter was measured. [15].

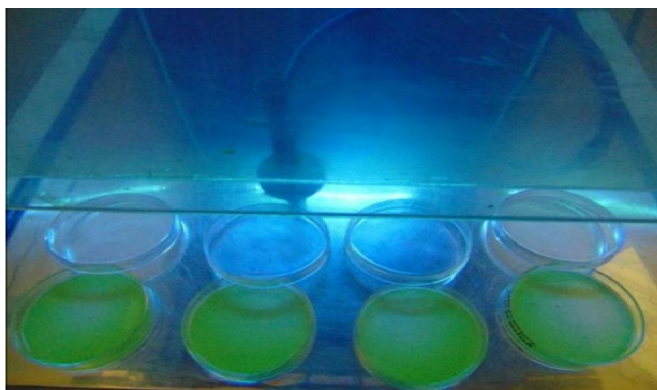


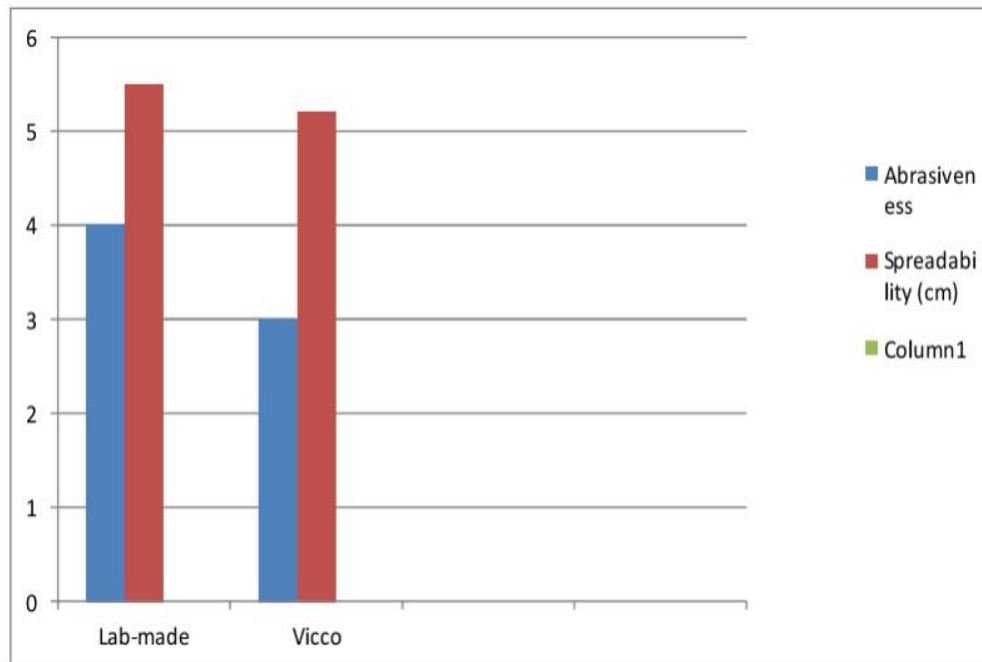
Fig.1.7: Preparation of Culture media



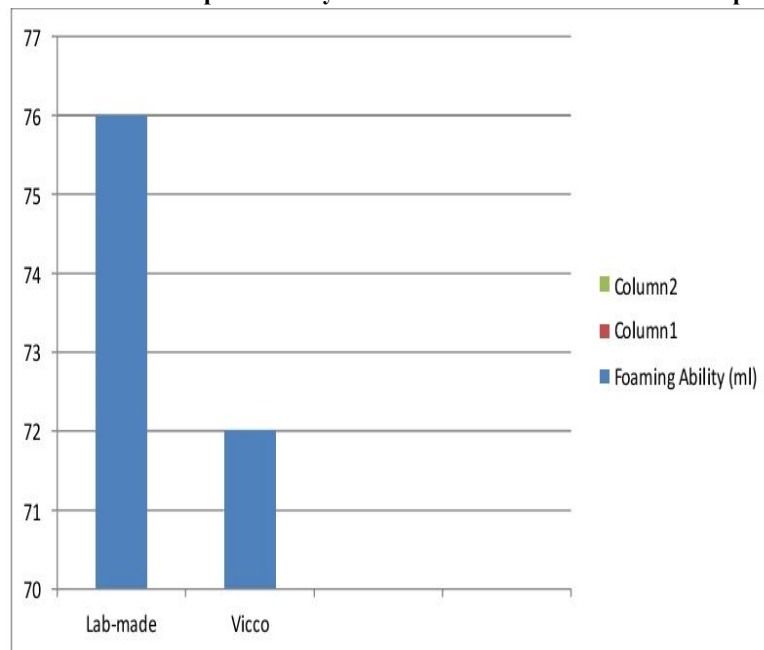
Fig. 1.8: Inoculation of Bacteria



Fig.1.9 : Growth and Inhibition of microbes



Abrasiveness and Spreadability of Lab made and Commercial Toothpaste



According to the findings of the current analysis, commercial formulations and those created in a lab often yield equivalent outcomes, and occasionally even superior ones. Both formulations have shown to be equally effective in terms of pH and foaming ability. More activity in terms of Spreadability and abrasiveness were demonstrated in a formulation made in a lab [11,13].

Comparison of the abrasiveness of marketing pastes to laboratory-created formulation indicates. Compared to pastes purchased from supermarkets, this combination created in a lab is more abrasive. Moreover, given According to the results revealed in the study, significant cleaning capacity formulations applied in business.

Each toothpaste has a decent consistency and a smooth feel. Furthermore proved phase separation, gassing, and fermentation are all indicators of degradation, samples were maintained at 45° to 20°C for the period of 28 days

Ideal Properties of Toothpaste

- Nontoxic and non-irritant
- Good abrasive effect
- Not expensive
- Easily available
- Acceptable taste
- With less side effects
- Keep the mouth clean and fresh
- Long lasting
- Do not impart stain on teeth[16]

In maintaining oral hygiene and avoiding dental caries, herbal toothpaste plays a significant role. Using this pattern as a guide, the right ingredients were chosen to create a lab-made herbal toothpaste that would be more stable.

Results are evaluated and contrasted with those from commercial herbal toothpaste. that laboratory-made toothpaste has an equal level of fervour to that of commercial toothpaste. formulations (Vicco).

The lab-made and commercially available herbal toothpaste have been assessed and contrasted with the requirements set forth by the Bureau of Indian Standards. This initial in vitro research showed that herbal toothpaste created in a lab was just as effective as commercial popular toothpaste in terms of all toothpaste rating criteria. Due of this, the evidence it has been determined from in-vitro research that laboratory-made herbal toothpaste created in a was deemed to be of high caliber

REFERENCES

- [1]. Patro BK, Ravi Kumar B, Goswami A, Mathur VP, Nongkynrih B. Prevalence of dental caries among adults and elderly in an urban resettlement colony of New Delhi. *Indian J Dent Res.* 2012;19(2):95–8. [PubMed] [Google Scholar]
- [2]. C. K. Kokate, Mr. A. P. Purohit, S. B. Gokhale. *A Textbook of Pharmacognosy.* 13th edi. Nirali Prakashan. 2002.
- [3]. Prasanth M. Antimicrobial efficacy of different toothpastes and mouthrinses: an in vitro study. *Dent Res J.* 2011;8(2):85–94. [PMC free article] [PubMed] [Google Scholar]
- [4]. Gamboa F, Estupinan M, Galindo A. Presence of *Streptococcus mutans* in saliva and its relationship with dental caries: antimicrobial susceptibility of the isolates. *Univ Sci.* 2004;9(2):23–7. [Google Scholar]
- [5]. Bagg J, Sweeney MP, Wood K, Wiggins A. Possible role of *Staphylococcus aureus* in severe oral mucositis among elderly dehydrated patients. *Microb Ecol Health Dis.* 1995;8(2):51–6. [Google Scholar]
- [6]. Berka-Zougali R, Ferhat MA, Hassani A, Chemat F, Allaf KS. Comparative study of essential oil extracted from Algerian *Myrtus communis* oil L leaves using microwaves and hydrodistillation. *Int J Mol Sci.* 2012;13(4):4673–95.
- [7]. BM, Saha RN. *A handbook of cosmetics;* 2000. p. 204–12
- [8]. Mangilal T, Ravikumar M. Preparation and Evaluation of Herbal Toothpaste and Compared with Commercial Herbal Toothpastes: An In-vitro Study. *Int J Ayurvedic HerbalMed.* 2016;5(10):2266–51
- [9]. Dange VN, Magdum CS, Mohite SK, Nitlikar M. Review on Oral Care Product: formulation of toothpaste from various and extracts of tender twigs of neem. *J of PharmRes.* 2008;1(2):148–52
- [10]. Okpalugo J, et al., Toothpaste formulation efficacy in reducing oral flora. *Trop. J. of Pharm. Research* 2009;8(1):71-7.
- [11]. Ozdemir A, et al., The determination of salivary zinc level following delivery from zinc containing toothpaste. *J. of Med. Sciences* 1998; 28(11):281-3.
- [12]. B. M. Mithal, R. N. Saha. *A handbook of cosmetics.* 1st edi. Vallabh Prakashan. 2000.
- [13]. Ramya kuber international journal of pharmaceutical and clinical Research 2005.

- [14]. Praphasri R, et al., Effects of fluoride dentifrice on remineralization of demineralized primary enamel. South East Asian. J. Trop. Med. Public Health. Vol 41 No. 1 January 2010
- [15]. Mahendra sekar et al International journal of pharmaceutical and clinical research 2016;(8):1155-1158.
- [16]. Kumar, Gn. (2017). Preparation, Evaluation And Comparision Of Herbal Toothpaste With Markedly Available Tooth Pastes. IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS, 12(6), PP. <https://doi.org/10.9790/3008-1206050106>