A REVIEW ON: FORMULATION AND EVALUATION STUDY ON HERBAL TOOTHPASTE

Dnyaneshwar Babasaheb Dhavle, Aishwarya Bhaurao Karegaokar,

Pavan Shivaji Kharat, Rushikesh D. Mohite

SSJPs Ojas Collage of Pharmacy, Ambewadi, Rewgaon Road Jalna - 431203

❖ ABSTRACT: -

The major goal of the research is to formulation and evaluation of herbal toothpaste. Herbal toothpaste with natural ingredients is more acceptable in public opinion than chemical-based synthetic formulations in the current oral dental care due to their safety and efficacy in reducing dental caries and preventing other dental disorders.

The purpose of this project is to make and test herbal toothpaste as well as promote public health. This research proves that our herbal-based toothpaste formulation with natural ingredients is as excellent as it gets in terms of performance.

In this composition, we use peppermint oil, clove oil, Neem leaves powder, Black pepper powder, all of which have never been used before in any research. These herbal ingredient gives anti-ulcer, anti-caries, anti-bacterial, and wound-healing properties, as well as certain unique properties including anti-cancer and anti-fungal. Herbal toothpastes were evaluated to determine important physical characteristics such as Colour-greenish, smooth in nature, pH determination- Acidic in Nature , Homogeneity, Sharp and edge abrasive particles, Foamability 7.8ml, Determination of moisture and volatile matter 6.7%, Spread ability 3.2cm, Stability study in order to develop a more effective and stable product.

Keyword: - Herbal ingredient, Introduction, Herbal Toothpaste, Antibacterial activity, Neem leaves, black pepper, Abrasive.

❖ INTRODUCTION: -

Herbal and Herbal based toothpaste has been used since many years ago in ancient life and is one of the main important components of oral health care. The manufacturing and development of toothpaste formulations began in China and India, as 300-500 BC. During that period, squashed bone, pulverized egg and clam shells were utilized as abrasives as a part of tooth cleaning. Modern toothpaste formulations were developed in the 19th century.

After the development in the field of medicines, chalk and soap were incorporated to those formulations. Immediately after the independence, several formulation advancements of different detergents had begun, sodium lauryl sulphate had been used as an emulsifying agent. In the modern era, the focus has shifted towards the release of active ingredients during formulation developments to prevent and/or treat oral illness. Toothpaste is a dentifrice used to clean, maintain and improve the health of teeth. Toothpaste is mainly used to promote oral cleanliness and also acts as an abrasive that helps to prevent the dental plaque. The majority of the cleaning is performed by the mechanical involvement of the toothbrush with the help of excipients used in toothpaste. The use of many herbal formulations are very effective as they contain active chemical ingredients such as polyphenols, gums, alkaloids, glycosides etc. These formulations have also been investigated to have different biological activities. This increases scope for formulating and evaluating new formulations of herbal toothpaste.

The main aim of this comparative study is to compare and evaluate the Herbal toothpaste formulations and comparing with marketed toothpastes. Toothpaste is commonly used product by all individuals. Toothpaste is generally used for cleaning of teeth and mouth. It is also used to treat many disorders of teeth. Many dentists recommend to use toothpaste to treat disorder like sensitivity, Chronic gingivitis etc. Herbal toothpastes can be prepared using different herbal extract of many crude drugs having antibacterial, antimicrobial activity. Herbal formulation of toothpastes is by prepared using herbs like Neem leaves, Black pepper, Clove oil, cinnamon oil. These herbal toothpastes can be evaluated by different tests like Physical Examination, Relative density, Abrasiveness, Determination of spread ability, pH determination, Homogeneity, Foaming, Stability, Determination of moisture and volatile matter, Moisture content, Foaming character, Organoleptic evaluation, pH, Fragrance test, Shape retention, Storage stability, Total flavonoid content estimation of Tooth paste Formulation, Stability study (Storage stability), Antimicrobial activity of toothpaste etc.

Most of synthetic tooth paste contain fluoride which cause adverse effect to tooth. So, to devoid such effect we formulated herbal based tooth paste, nowadays natural sources remain attractive primarily when compared to the synthetic one, so herbal tooth paste are popular with the consumer when compared to the synthetic one which are devoid of side effect, minimum number of ingredients.

Toothpastes are the most common preventive means in oral health care. Many commercially available dentifrices claim to have antimicrobial properties, but little research has been conducted to investigate these claims. Therefore, this study was conducted to evaluate the efficacy of different toothpaste formulations in reducing the oral microbial load. The selected tooth paste formulations were effective in controlling the microbial load and therefore contributing to maintain good oral hygiene. However, practicing appropriate oral hygiene measures & brushing technique is of utmost importance in maintaining good oral health than the effectiveness of various ingredients in the toothpastes used.

Chronic gingivitis is one of the most common oral diseases with high prevalence around the world. Dental plaque is the major etiological and initiating factor for the development of gingivitis However, due to the limitation of mechanical methods, the addition of some safe and effective drugs to prevent gingivitis in toothpaste is also considered to be a good supplementary to the control of mechanical plaque. those certain chemicals, such as chlorhexidine or triclosan, are added to the toothpaste to directly inhibit the formation of plaque.

Various chemical agents have been used in toothpastes and mouth rinses and a few have been shown to reduce dental plaque formation. Due to an increased awareness of indigenous medical practices in various parts of the world, the use of "herbal" medicine has engendered interest and facilitated the growth of complementary and alternative therapies in health care promotion.

Ideal Properties of Toothpaste

Non-toxic and non-irritant.

Good abrasive effect.

Inexpensive.

Readily available.

Pleasant flavour with fewer side effects.

Keep the mouth fresh and clean & Long lasting.

❖ FORMULATION OF HERBAL TOOTHPASTE: -

Herbal Toothpaste Formulation of Ingredients

Sr. No.	Ingredient	Quantity (g)	Uses
1	Neem leaves	0.5	Antibacterial
2	Black Pepper	0.5	Antioxidant
3	Peppermint oil	0.5 ml	Flavouring agent
4	Clove oil	0.5 ml	Anti-inflammatory
5	Propyl paraben	0.3	Preservative
6	Glycerine	2.0 ml	Humectant
7	Sodium lauryl sulphate	0.5	Foaming agent

8	Sodium chloride	0.2	Abrasive
9	Camphor	0.5	Antiseptic
10	Dicalcium Phosphate	3.5	Abrasive
11	Distilled water	q.s.	Vehicle

❖ MATERIALS AND METHODS: -

Chemical: -

1. Dicalcium Phosphate, 2. Salt, 3. Camphor, 4. Sodium lauryl sulphate, 5. Propyl paraben

6. Glycerine

Plant collection : -

The following ingredients are collected from SSJPs Ojas Collage of Pharmacy, local area and local market.

1. Neem leaves

2. Black pepper

3. Clove oil

4. Peppermint oil

❖ FORMULATION: -

There are two types of toothpaste formulation procedures, viz.

1. Dry gum method

2. Wet gum method

Dry Gum Method :

1. 1st up all take a glassware's & equipment required for formulation and evaluation of herbal toothpaste than they clean and dry.

2. The solid ingredients Dicalcium Phosphate, sodium lauryl sulphate, Salt, Camphor, propyl paraben was weighed accurately as mentioned in the formula and sieved with sieve no.80 to maintain the particle size.

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

4. Addition of herbal ingredients

5. Accurately weighed herbs powder of neem leaves and black pepper were added to the base.

6. Then addition of as a colouring agent

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

❖ MAKING OF HERBS POWDER: -

1. First wash the neem leaves and black pepper with water.

2. After the washing of dry the herbs in the shade presence of sunlight for 2 or 3 days.

3. When the herbs are dried then they are grinding in a grinding machine separately.

4. The grinding of herbs should be fine in size.

5. Then the obtain powder is pass through the 80.no sieve.

6. The store in tightly close container.

Composition: - All ingredients should be complied with the Indian standard.

NEEM LEAVES POWDER

BLACK PEPPER POWDER

❖ EVALUATION TEST OF FORMULATED HERBAL TOOTHPASTE: -

1. Physical Examination:

• Colour- Formulated toothpaste was evaluated for its colour.

• The visually colour was checked.

• Odour- Odour was found by smelling the product.

• Taste- Taste was checked manually by tasting the formulation

Smoothness – By rubbing the formulation between the fingers, the paste's smoothness was evaluated.

2. Relative density:

Relative density was determined by weight in gram taken in 10 ml formulation and 10 ml distilled water using RD bottle Evaluation Parameters.

Sr. No.	Parameters	Observations
1	Colour	Greenish
2	Odour	Characteristic
3	Taste	Characteristic
4	Smoothness	Smooth
5	Relative density	7.8

3. Fragrance test:

It was based on individual observation for its acceptability. 5 people were asked for acceptability of fragrance and their opinion was taken. And fragrance was evaluated based on the below-described criteria.

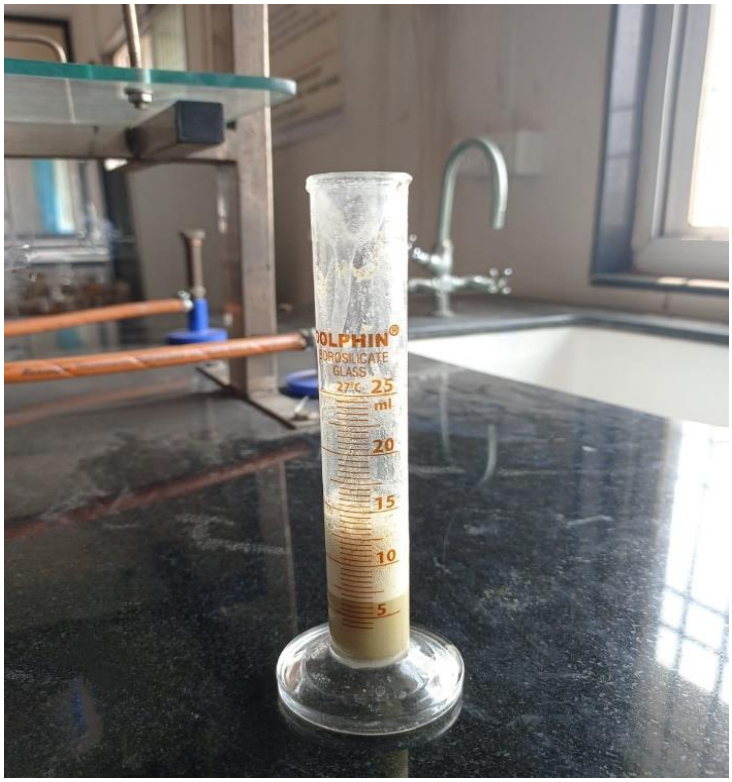
A) The fragrance was good, as good as the fragrance of reference toothpaste.

B) The fragrance was not so good but comparable to the reference toothpaste.

C) The fragrance of the toothpaste was poor than the reference toothpaste.

4. Foamability:

The foaming power (Foamability) of herbal toothpaste was determined by taking 2g of toothpaste with 5ml water in measuring cylinder initial volume was noted and then shaken for 10 times. Final volume of foam was noted.



Foaming power was determined by the following formula.

Foaming power = V1 – V2

V1 - Volume in ml of foam with water.

V2 - Volume in ml of water only.

5. Determination of moisture and volatile matter:

Moisture and volatile matter were determined by using 5gm of herbal toothpaste was placed in a porcelain dish of about 6-8cm in diameter and 2-4cm in depth. Dried in an oven at 1050C.

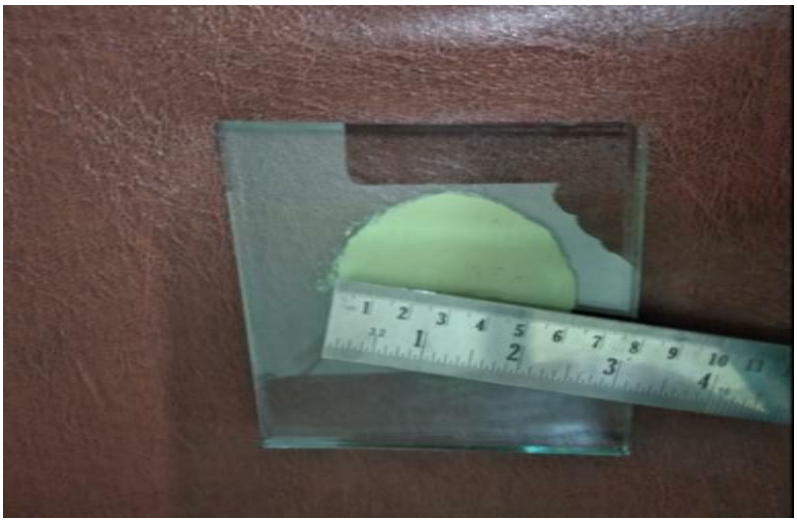
Calculations:

% by mass = 100Ml / M

Ml -Loss of mass (g) on drying, M- Mass (g) of the material taken for the test.

6. Spread ability:

About 1 g of formulated toothpaste was placed in the centre of a glass plate (10 x 10 cm) and a second glass plate placed over it. Then 2 kg weigh was carefully placed on top of the set up and allowed for 3 minutes. The weight was removed and the diameter of the paste was measured in cm. Repeating the experiment and noted the average value of three readings.



7. pH determination test: pH of formulated herbal toothpaste was determined by using pH meter. 10g of toothpaste placed in 150ml of beaker. Allow the 10ml of boiled and then cooled water. Stir vigorously to make a suspension.

❖ EVALUATION TEST RESULTS AND DISCUSSION: -

The herbal tooth paste formulation was prepared from Neem leaves, Black Pepper, cinnamon Oil, Clove Oil, Natural ingredient and small amount of synthetic ingredient. At the trial phase of formulation three batches were performed due to the problem like homogeneity, spread ability, and foamability the two-batch discarded permantly and only single batch was selected for next steps. The formulated herbal toothpaste greenish brown in colour and the research concluded that Herbal toothpaste an emphasizing and more acceptable in dental research and they are safer with minimum side effect than synthetic preparation. The formulated toothpaste capable to the tooth and oral hygiene and show the anti-microbial activity against pathogen. The formulation compared with market preparation. Therefore, it shows the equal patronizing and engrossing passion over the marketed formulations (Colgate, Danta Kanti). The formulated herbal toothpaste has been good scope in future in nature remedies research and Health of public.

Sr. No.	Parameters	Observations
1	pH	Acidic in Nature
2	Foamability	7.8ml
3	Moisture content	6.7 %
4	Spread ability	3.2 cm
5	Fragrance	Good

❖ COMPARATIVE STUDY: -

FORMULATED HERBAL TOOTHPASTE WITH MARKETED PREPARATION

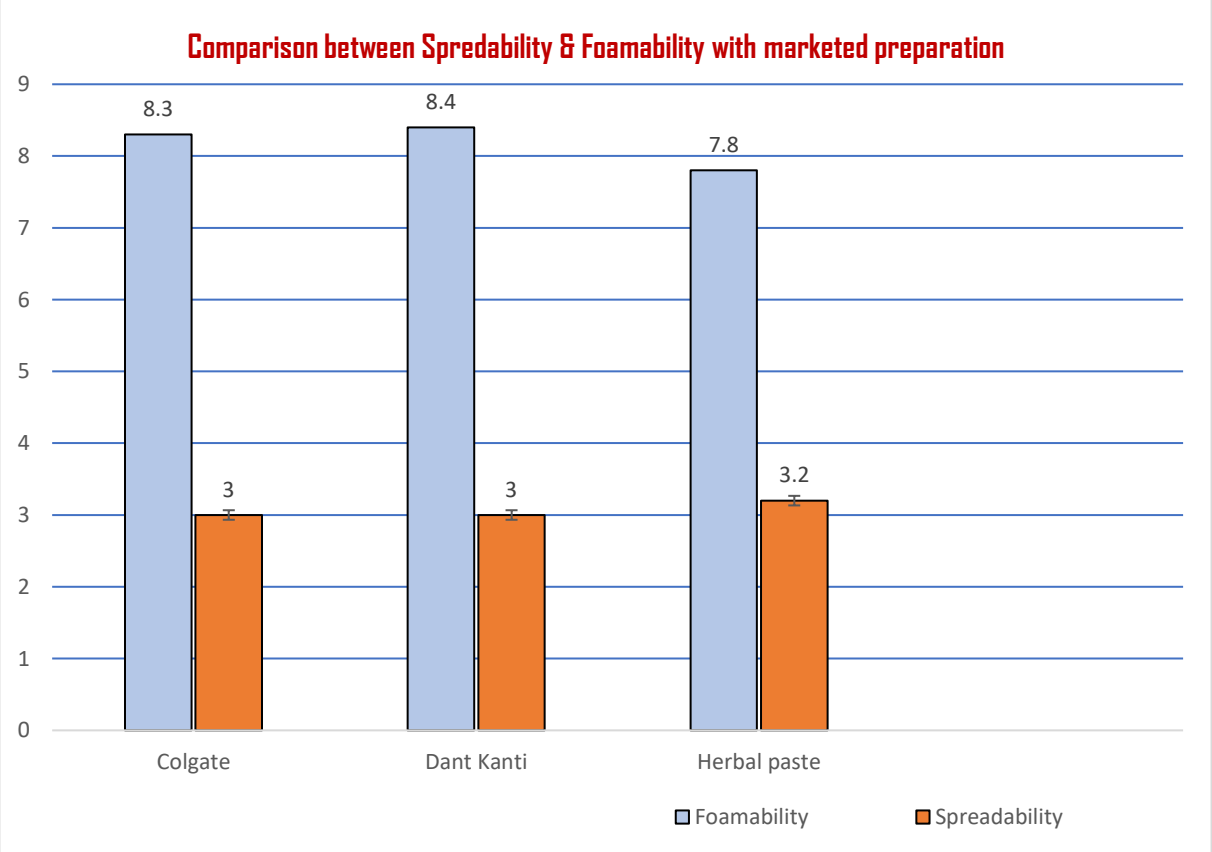
The formulated herbal toothpaste was compared with marketed preparation follows Anti activity, Spread ability, Foamability, pH determination, % Moisture content.

% Moisture Content Comparison

Preparation	% Moisture content
Colgate	15.20%
Dant Kanti	8.80%
Herbal Toothpaste (Lab Formulation)	6.7 %

The above Graph Chart and % Moisture Content Table shows that formulated herbal toothpaste is having and equal or near about and engrossing passion over the marketed preparation (Colgate and Dant Kanti).

❖ CONCLUSION: -



Herbal toothpaste shows the good action to maintaining the dental caries and oral hygiene. The herbal toothpaste shows the safer minimum side effects. The formulated herbal toothpastes is evaluated by

different tests like Physical Examination, pH determination, Homogeneity, Sharp and edge abrasive particles, Determination of moisture, Spread ability, Stability study etc

The formulation compared with market preparation. Therefore, it shows the equal patronizing and engrossing passion over the marketed formulations. The formulated herbal toothpaste has been good scope in future in nature remedies research and Dental health of public.

❖ References: -

1. Deep Sujit Sahani, D. S. (2022, Volume 9, Issue 12). Formulation and Evaluation of HerbalToothpaste. *JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)*, d557 - d563.

2. Dr. Shahidullah, S. S. (May 2023 Vol. 10, Issue 2). HERBAL TOOTHPASTE. *INERNATIONAL JOURNAL OF RESEARCH*, 209, 217 and 218.

3. Hingane, P. C. (July 2022 vol.10, issue 7). Formulation and Evaluation of Herbal Toothpaste. *INTERNATIONAL JOURNAL OF OF CREATIVE RESEARCH THROUGH (IJCRT)*, a530 - a537.

4. Nikita M. Rathi, S. V. (April 2022, Vol. 7, issue 4). Formulation and Evaluation Study on Herbal Toothpaste. *International Journal of Novel Research and Development (IJNRD)*, 968 - 973.

5. Pavan Deshmukh, R. T. (2017, vol. 5 issue 10). Formulation and Evaluation of Herbal Toothpaste Compared with Marketed Preparation . *INTERNATIONAL JOURNAL OF PHARMACEUTICS & DRUG ANALYSIS*, 406 - 410.

6. Vijay Jagtap, T. R. (july - septembar 2020, vol.10 (issue 03)). Preparation, evaluation and comparison of herbal toothpaste with marketed herbal toothpaste. *Asian Journal of Pharmacy and Technology*, 165 - 169.

7. Singh K, Singh P, Oberoi G. Comparative Studies Between Herbal Toothpaste (Dantkanti) And Non-Herbal Tooth Paste. Int J Dent Res. 2016;4(2): 53-56.

8. Shende V, Telrandhe R. Formulation and Evaluation of Tooth Gel from Aloe Vera Tract. Int J Pharm Drug Analysis. 2017;5(10): 394-398.