



Fabrication and Evaluation of Tooth Gel Loaded with Herbal Materials

S. Dipti*¹, T. Sheela Rani¹, O.Suhru Latha¹ ,P. Venkatesh¹ and K.Chitra¹

Faculty of Pharmacy, SRIHER (DU) ,Porur, Chennai -600116

Received: 10 Mar 2019 / Accepted: 9 Apr 2019 / Published online: 1 Jul 2019

*Corresponding Author Email: sheelathiru@yahoo.co.in

Abstract

Aim: The main aim of the present work is to formulate and evaluate the prepared tooth gel.

Methodology: Fabrication of herbal tooth gel was carried out using some herbal crude materials like guava, cinnamon, clove and fennel. These crude herbs were extracted using ethanol by cold maceration process. After the extraction process the tooth gel was formulated using carbapol 934 along with the utility of various additives like humectants, sweeteners, preservatives, colouring agents, foaming agent and preservatives. The formulation was subjected to certain evaluation tests like spreadability, foaming capacity, viscosity, pH, abrasiveness and cleaning ability. The obtained results were compared to standard values.

Results: The results obtained after carrying out the evaluation parameters showed that the prepared tooth gel is considerably good in terms of quality

Keywords

Clove, fennel, cinnamon, guava, tooth gel, evaluation parameters, formulation

INTRODUCTION:

Calcified structures in the mouth that help in the breakdown of food are known as teeth. Tooth gels and toothpastes are commonly used as dentifrice as they help in cleaning of teeth by removing plaque and help in preventing cavities. Fennel is a very effective ingredient employed in the manufacturing of various toothpastes. The effectiveness can be attributed to the presence of essential oils which have gum healing properties. Clove is one of the most important components in any tooth formulation due to its local anesthetic property which relieves pain in teeth. In addition to the above

it has a very fragrant odour due to which it can prevent bad breath. Like clove, guava also has the same effects. Recent research shows that it can cure gingivitis. Cinnamon is widely used in the treatment of sensitive teeth. It is also used to relieve tooth aches temporarily due to its local anesthetic activity. The above active ingredients in a tooth gel would aid in the formulation of a very active tooth gel. The aim of the study is to formulate a tooth gel, evaluate various parameters like spreadability, foaming ability, viscosity, abrasiveness, pH and to compare the values obtained with that of the values given in various Standards.



Figure: 1
CINNAMON
BARK



Figure: 2
GUAVA
LEAVES



Figure :3
CLOVE
BUDS



Figure:4
FENNEL
SEEDS

MATERIALS AND METHODS:

Herbal ingredients required:

Clove buds, guava leaves, cinnamon bark, fennel seeds.

Chemicals required:

Glycerol, Sodium laurel sulphate, Sodium Saccharin, Propyl paraben, Amaranth solution,

Calcium carbonate, Carbapol -934 and ethanol

Instruments and apparatus required:

Brookfield's Viscometer, pH meter, glass slides of dimension 10X10 cm, mechanical stirrer, beakers, porcelain dishes, microscope.

Active ingredients:

TABLE: I LIST OF ACTIVE INGREDIENTS USED

PLANT USED	PARTS OF PLANT USED	QUANTITY
Guava	leaves	1g
Cinnamon	Bark	0.5g
Clove	flowering buds	0.5g
Fennel	Fruit	0.5g

TABLE: II –LIST OF EXCIPIENTS USED

S.NO	NAME OF EXCIPIENT	USE	QUANTITY
1	Glycerol	Humectant	3g
2	Sodium laurel sulphate	Foaming agent	0.15g
3	Sodium Saccharin	Sweetener	0.30g
4	Methyl paraben	Preservative	0.5g
5	Amaranth solution	colouring agent	0.15 g
6	Calcium carbonate	Abrasive	2g
7	Carbapol -934	Gelling agent	3%solution
8	Water	Vehicle	Quantity sufficient to 10g

Extraction procedure:

All the herbal ingredients were dried for a few days and ground using a domestic mixer. The powdered herbs were extracted using ethanol as a solvent by the application of cold maceration technique. The marc was dried, and the extract obtained was stored in the desiccator until it is needed

Preparation of tooth gel:

The required quantity of each extract was dissolved in a little amount of water. The solution was subjected to filtration to discard impurities.

The tooth gel was prepared using 3%carbapol gel. The plant extracts were dissolved in water and were kept in a separate container.

The additives were added into another container. Carbapol was added to this and stirred well to form a gel. The dissolved plant extracts were added into this one after the other and calcium carbonate was added to this and blended well. This was then evaluated for Spreadability, viscosity, pH, extrudability, cleaning ability

FIGURE :3 - FORMULATED TOOTH GEL



EVALUATION OF TOOTH GEL:

The tooth gel that was formulated was checked for various parameters.

- 1) Appearance: The appearance of the tooth gel was determined. The colour and the homogeneity were observed.
- 2) Odour: The smell of the tooth paste was determined.
- 3) Taste: A small amount of the toothpaste was tasted. The toothpaste should possess acceptable taste.
- 4) pH: The pH of the solution was determined by using a pH meter. Before using the pH meter, it was calibrated using standard buffer solutions. After calibration the electrode was dipped into 1% of the solution of the formulated tooth gel. The tooth gel is acceptable if the pH range between 5.5 and 10.5
- 5) Spreadability: The spreadability was determined by taking 1g of the tooth gel and placing it in the center of a glass slide of 10X10 cm glass slide. Another glass slide of the same dimension was placed on top of the slide contains the formulation. The tooth gel was sandwiched between the two glass slides. A standard weight of 1kg was placed on top of this. The setup was left for 10 minutes After the time was complete the diameter of the extent to which the gel spread was noted.
- 6) Cleaning ability: The shell of the egg has high calcium content. Due to this property it can be used to determine the cleaning ability. The egg was boiled in 120 ml of water. It was then cooled for 1 to 2 hours. After cooling it was dipped in 15 ml of acetic acid. After the above procedure it was dipped in food colour. The coloured egg was dried. Then the tooth

gel was applied on a toothbrush and the eggshell was brushed. If the colour disappears then the tooth gel is claimed to have good cleaning ability.

7) Foaming ability: The foaming ability was determined by taking 1g of the tooth gel and dissolving it in 30ml of water. This was then poured into a measuring cylinder and the measuring cylinder and covered with a parafilm. The measuring cylinder was shaken 25 times and the foam after shaking was determined.

8) Smoothness: The prepared tooth gel was rubbed between the fingers and the smoothness was determined.

9) Viscosity: The viscosity of the tooth gel was determined by using a Brookfield's Viscometer.

10) Extrudability: An empty aluminum collapsible tube was weighed. It was then filled with a known quantity of tooth gel. The weight was noted again. Then a weight of 500 g was placed on the tube. The amount of tooth gel extruded was collected and weighed. The percentage of gel extruded was determined.

11) Stability: The stability of the tooth gel was checked as per ICH guidelines. The tooth gel was stored at different temperatures and at different humidity conditions. During the studies the pH should be checked

RESULTS:

The evaluation tests were carried out for the tooth gel. From the results tabulated below, it was determined that the tooth gel met all the desired standards.

TABLE: III OBSERVATIONS OF EVALUATED PARAMETERS

S.NO	PARAMETERS	OBSERVATIONS
1	APPEARANCE	Red colour gel, homogenous in nature
2	ODOUR	Aromatic odour
3	TASTE	Sweet taste
4	pH	7.03
5	SPREADABILITY	10cm
6	CLEANING ABILITY	The colour was completely removed on brushing the coloured egg
7	FOAMING ABILITY	40 cm
8	SMOOTHNESS	smooth to touch
9	VISCOSITY	9 Centi poise
10	EXTRUDABILITY	85.8%
11	STABILITY	stable at all temperatures

CONCLUSION:

Dental products play a very important role in maintaining the cleanliness of teeth and good dental health. Nowadays herbal tooth formulations like tooth gels and toothpastes are earning their place in the pharma market due to their efficiency in cleansing teeth moreover, the ingredients in the formulations have very good therapeutic activity which is vital for preventing cavities. Many ingredients in herbal tooth formulations produce local anesthesia which is useful in tooth aches.

The research concluded that the herbal tooth gel is of good quality, is acceptable in dental research and is safe with minimum side effects compared to that of a synthetically prepared tooth gel. The prepared tooth gel is attributed to a good future by aiding dental health in public.

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