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Formulation and evaluation of toothpaste for sensitivity

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Abstract

Toothpastes are complex mixtures of abrasives and surfactants; anticaries agents, such as fluoride; tartar control ingredients; pH buffers; humectants (to prevent dry-out and increase the pleasant mouth feel); and binders, to provide consistency an shape. Binders keep the solid phase properly suspended in the liquid phase to prevent to the separation of the liquid phase out of the toothpaste. The dental paste preparations of clove oil tooth paste are designed using different bases for treatment of gingivitis and properties and other dental plaque. During our physicochemical evaluation studies, all the formulations were found to have PH, good tube extrudability, good spread ability and viscosity characteristics.

In the current context of oral dental care, the use of toothpaste containing natural ingredients are more widely accepted in public belief than chemical-based formulations for safety and efficacy in reducing tooth decay, and preventing other dental problems that this generation is prone to. It's usually a toothpaste-used product used by all people. Toothpaste is usually used to clean tooth enamel and mouth It is also used to solve many email problems. Many dentists recommend applying toothpaste to treat diseases such as sensitivity, chronic gingivitis, etc toothpastes are used in the treatment of gum disease, bad breath, dry mouth, periodontal damage, tartar, and dental caries. To develop a stable and functionally effective toothpaste, eliminating all synthetic additives that are usually included in such Formulation is an important task. Herbal toothpastes have received a lot of attention for reducing gingivitis.Studies show mixed results about the effectiveness of these toothpastes.

Keyword: Clove oil; Toothpaste; Anti inflammatory activity; Gingivitis

1. Introduction

Toothpastes have been used since the ancient past. Are one of the main irreplaceable components of oral health care. The design of toothpaste formulations began in China and India, as of 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. Later on, chalk and soap were incorporated to those formulations.After 1945, several formulations Advancements in different detergents had begun; sodium lauryl sulfate had been used as an emulsifying agent.In recent years, the focus has shifted towards the release of active ingredients during formulation development 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 dental plaque and food particles from the teeth, aiding in the removing and/or veiling of halitosis, and releases active ingredients such as fluoride to aid in preventing tooth and gum disease.Toothpastes are complex mixtures of abrasives and surfactants; anticaries, such as fluoride; and tartar. control ingredients; pH buffers; humectants (to prevent dry-out and increase the pleasant mouth feel); binders (to provide consistency and shape).

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Binders keep the solid phase properly suspended in the liquid phase to prevent the separation of the liquid phase from the toothpaste. They also provide body to the dentifrice, especially after extrusion from the tube onto the toothbrush. It is the responsibility of oral care. Professional to understand the ingredients in toothpastes and direct patients to different products based on their individual needs.In this building, we use aloe vera gel, clove oil, neem powder, pomegranate leaf powder, that have not been used by any other research work. These quotes have many functions, such as anti-ulcer, anti-caries, anti-bacterial, wound healing, and many other special features such as anti-cancer and fungal. Most of the Cleaning is done by the mechanical use of the toothbrush with the help of auxiliaries used in toothpaste.Toothpastes generally help to keep teeth healthy and also help to prevent gingivitis and tooth decay, which lead to more serious dental problems. The toothpaste comes in different flavours and helps keep your mouth and breath fresh after brushing. It can also mask the odours of strong aromatic foods such as garlic or onions. Gingivitis is often cured with good oral hygiene, such as brushing and flossing longer and more often. In addition, to tooth pastes, antiseptic mouthwash may also be helpful.

1.1. Ideal properties of toothpaste

- Good abrasive effect
- Non irritant and non toxic
- Impart no stain in tooth
- Keep the mouth fresh and clean
- Prolonged effect
- Cheap and easily available

2. Materials and Methods

2.1. Chemical

- Sodium lauryl sulfate
- Methyl paraben

Figure 1 All materials

- Titanium dioxide
- Calcium carbonate
- Menthol
- Glycerin

2.1.1. Sodium lauryl sulphate

Sulfate Most of the toothpastes have sodium lauryl sulfate (SLS) or lauryl sarcosinate, a foaming lather (detergent) which keeps paste in the mouth and removes dirt and grease from the teeth. Detergents cause sensitization and interfere with the functioning of taste buds by breaking up the phospholipids. It irritates the oral tissues and can cause canker sores, oral ulcers, stomach problems, and even cancer. The SLS is a carcinogen and contains traces of 1,4-dioxane, which is classied by the International Agency for Research on Cancer as a Group 2B carcinogen. Moreover, it also causes toxic to the aquatic life.

2.1.2. Methyl paraben (C8H8O3)

They preserve products to extend their shelf life, which proponents say is vital to consumer health and safety. Methyl paraben in its water-soluble form is therefore an ideal paraben for use in, for example, mouthwash or toothpaste.

Humactant

Humectants retain water and help maintain a consistent paste-like quality in the toothpaste, preventing a separation of the liquid and solids in the toothpaste. Humectants in some cases can affect flavor, coolness and sweetness.

Examples: sorbitol, pentatol, glycerol, glycerin

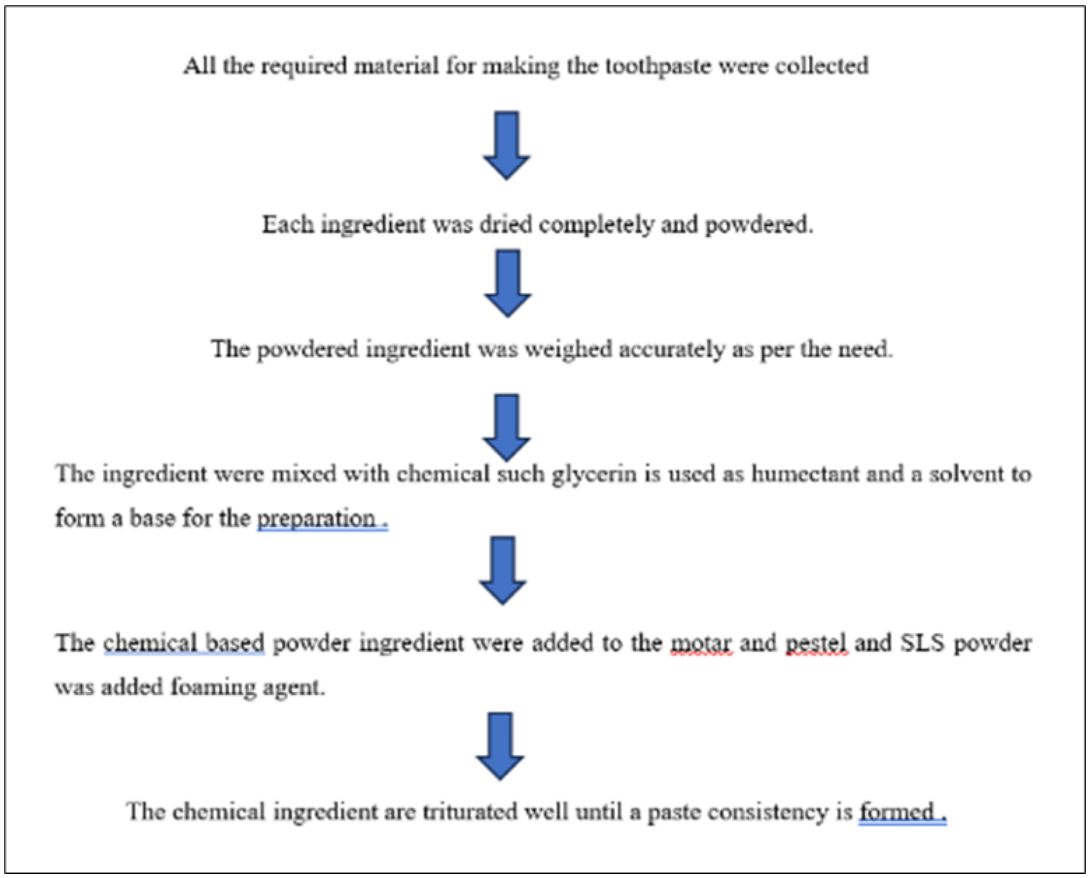
2.2. Plant collection

2.2.1. Clove oil

Medicated tooth paste was prepared using, clove oil, , gum tragacanth, calcium carbonate, sodium lauryl sulfate, , sodium chloride, and methyl paraben, menthol, titanium dioxide, and glycerine. and clove oil possess antibacterial activity.

The sodium lauryl sulfate used gives foaming, menthol as a sweetening agent, methyl parabens as a preservative, and glycerine as a humectant.

All these chemicals were purchased from SD Fine Chemicals in Islampur.



2.3. Method of preparation of toothpaste

2.3.1. Trituration method

The binder is premixed with solid abrasives and triturate, which are then mixed with the liquid phase containing humectants and oils.Then, add preservatives and sweeteners to the mixer.After the formation of a homogeneous paste, the flavor and the detergent were added last at a slow speed.Agitation to minimize foaming, mixed, milled, , and tubed.

2.3.2. Microbiological studies

In present work, antibacterial activity of paste was tested by used against causative microorganism on agar plates. By taking microorganism such as E. coli, candida albicans, staphylococcus aureus. In the disk-diffusion susceptibility take a look at, disks containing recognized quantities of an antimicrobial agent are positioned at the floor of an agar plate containing a nonselective medium that has been inoculated with a suspension of a pressure of E.coli to supply a confluent garden of boom.

An in-vitro antibacterial study of the prepared tooth paste was performed by the well diffusion method using Muller Hinton Agar medium against a pathogenic bacterial strain. Initially, the plates were brushed with inoculant, and 5 mm-diameter holes were made on the agar plate with a sterile cork borer.

The prepared paste and marketed preparations were then placed in the wells of cultured plates. Each plate was examined after 24 hours of incubation. The diameter of the zone of inhibition (ZOI) was measured in millimetres (mm) with a rural.

2.3.3. Experimental work

Table 1 Experimental work

Ingredient	**Quantity**	**properties**
Clove oil	1.5ml	Antioxidant
Gum tragacanth	2g	Viscous
Calcium carbonate	20g	Abrasive agent
Methyl paraben	0.5g	Antimicrobial
Menthol	0.2g	Cooling agent
Titanium dioxide	1g	Whitening agent
Sodium lauryl sulphate	2.5g	Foaming agent
Distilled water	10 ml	vehicle

2.4. Evaluation of toothpaste

2.4.1. Evaluation

- Colour:- Colour of the prepared toothpaste was evaluated for its color. The Color was checked visually and found white colour .
- Odour:- Odour was found by smelling the product. The odour was checked visually and found characterstics.
- Taste:- Taste was checked manually by tasting the product and found sweet.

2.4.2. Physical characterization test:

- Determination of Ph

Take 1 gm of the tooth paste in a 50 ml beaker and add10 ml of freshly boiled and cooled water (at 27ºC). Stir well to make a thorough suspension. Determined the pH of the suspension within 5 minutes, using digital pH meter.

The results were mentioned>

Figure 2 Determination of pH

2.4.3. Stability study

The toothpaste shall be stable but not to deteriorate, ferment, or segregate during normal storageconditions and usage. Stability of toothpaste can be tested when it is exposed to 45±20 °C for a period of 10 days.

After storage, no phase separation, fermentation, or gassing can be observed. Also exposed to cool conditions such as 50 °C for 1 hour, no obstruction of the extrudable from the container is observed.

2.4.4. Homogeneity

By applying normal force at 270 C. The toothpaste should extrude a homogeneous mass from the collapsible tube or othersuitable container. Furthermore, the bulk of the contents must extrude from the container's crimp and be rolled out gradually.

2.4.5. Cleaning capacity

200 ml of water was heated in a beaker, and 15 ml of vinegar and 20 drops of red food coloring were added to it respectively.A hard-boiled egg was immersed in food coloring solution for 5 minutes until it was stained with red.

A line was made with a permanent marker running the length of the eggshell, dividing it in half. Moisten the toothbrush with distilled water, and it was used to brush one side of the egg with 10 strokes (each stroke was a full back and forth motion). The egg was checked for color removal.

The toothbrush was washed. with water, a pea-sized amount of formulated toothpaste was applied to the toothbrush, and the other side of the egg was brushed with the brush in 10 strokes.The egg was washed and checked for discoloration.

2.4.6. Foamability

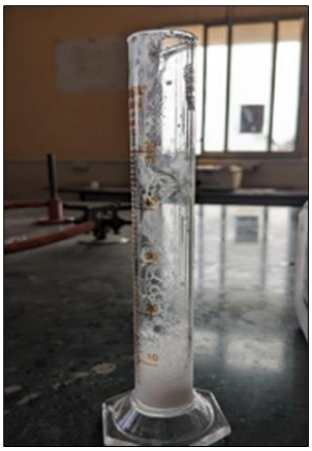


Figure 3 Foaming agent

The foaming ability of the product was evaluated by taking small amount of preparation with water in a measuring The cylinder's initial volume was noted and then shaken for 10 times.

Final volume of foam was noted.

2.4.7. Viscosity

Paste viscosity measurements were evaluated using a Brookfield digital viscometer (LV DV–II Ultras programmable Remoter, USA) using spindle no.3 by applying increasing values of the shear rate, in order to reveal possible flow behavior of the pastes. All viscosities measurements were performed at controlled temperature of 50 Pa-s

As shown in fig. 4

Figure 4 Determination of viscosity

2.4.8. Sharp and edge abrasive particle

To verify the presence of any sharp or abrasive particle, The contents were placed on the finger and scratched on the butter paper for 15-20cm. I went through the same process. at least ten times.

There were no sharp or edge abrasives particles discovered. As shown in-

Figure 5 Abrasiveness

3. Result and discussion

Table 2 Physical evaluation of formulation

Sr. no.	Parameters	Observation
1	Ph	6.8
2	Foamability	5.5
3	Viscosity (Pa-s)	50 Pa-s
4	Excludability	Good

Table 3 Description

Sr no.	Parameter	Observation
1	Color	White
2	odour	Characterstics
3	Taste	Sweet
4	Stability	Stable
5	Spread	Easily spread
6	Abrasiveness	Good abrasive
7	Foamability	Good

4. Conclusion

The dental paste preparations toothpaste for sensivity designed using different bases for treatment of gingivitis, and dental plaque. During our Physicochemical evaluation studies all the formulations were found to have PH, good tube extrudability, good Spread and viscosity characteristics From the above research studies we can conclude that the results obtained in formulation of tooth paste using different ingredients such as combination of clove oil and clove oil to inhibit bacterial growth respectively.

During our quality control test for our respective optimized formulation were observed to have pH, good physical properties, good spread, foamability, moisture content and antimicrobial activity was found to be 15mm.

The current design has good organoleptic, spreading, foaming, abrasive, and in vitro antimicrobial properties. It also has the advantage of not having harmful substances, chemicals, and the presence of herbal powders, a wide range of natural compounds good for teeth and the oral cavity toothpastes. Because design has future prospects for such design and widespread use.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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