

FORMULATION AND EVALUATION OF NATURAL TOOTH POWDER

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Abstract

The arranged Tooth Powder was assessed for its organoleptic and physical characteristics such as color, smell, taste, soundness, foam ability and abrasiveness to guarantee that it have all the specified highlights to utilize against the dental illness. The result was found inside the allowed limits.

Dentifrices are the item which is utilized to preserve the Verbal Hygiene such as Freshness of mouth and to maintain a strategic distance from tooth rot. The verbal cleanliness can be kept up all through the day by utilizing different dentifrices arranged by home grown and engineered fixings. This work was carried out to get ready Tooth powder which can be utilized as a instrument for legitimate verbal cleanliness and to overcome the side impact of the ordinary Tooth control arranged by engineered fixings. The Tooth Powder was arranged by utilizing different home grown fixings which have the antibacterial, clean and cooling properties,

Unique Powders are pharmaceutical strong measurement shape experienced in nearly each perspective of drug store both in industry and in home. A pharmaceutical powder could be a blend of finely isolated drugs and chemicals in dry shape, which are implied for inner and outside utilize. The display work is aimed to clarify the pertinence of toothpowder within the current situation. The by and large think about concludes around the

characteristics, sorts, properties, arrangement and assessment of toothpowder. Herbal tooth powders comprising of different fixings that are accessible within the advertise in a wide run. Subsequently advanced strategies centering on these viewpoints are valuable for the standardization of herbs and their details.

Customers accepted by using herbal-based toothpowders are secure, successful, and less harmful. The verbal depression contaminations are the foremost common sorts of diseases. Dental caries is an irresistible infection, causes harm and contamination of finish and dentine. In the event that it isn't treated, the infection continues and will lead to tooth misfortune. The mouth contains typical greenery of deft microbes that are ordinarily non-pathogenic.

The awkwardness of this circumstance causes disease and tooth rot. Streptococcus mutants are considered as the main species included within the advancement of dental caries. S. mutants, acid-producing microscopic organisms, causes aging of carbohydrates which comes about in tooth decay.

In this manner, within the show work, the taking after perspectives of Home grown tooth powders were arranged for the definition, standardization of home grown tooth powder, and anti-bacterial screening of the extricates of herbal tooth powder.

Keywords: *Herbal ingredients, oral hygiene, Antibacterial activity. Dental caries. herbal tooth powder*

Introduction

Dental problems are very common in globalising countries. The common dental problems like gingivitis, halitosis (bad breath), tooth discolouration, plaque or tartar deposition are caused by the poor food habits, and having lack of knowledge of oral hygiene. These problems become severe to our health, if it is not maintain properly. The three types of dental problems are dental plaque, dental caries, periodontal disease. Periodontal disease is a disease when gingivitis is not treating and inflammation spreads around the tooth. This inflammation makes gaps and infection between gums and teeth. Due to this infection the supports of teeth such as gums, bones and tissues get destroy by which teeth become loose and remove from this place. Dental caries in Latin means 'rot' or rotten. Rotten teeth are signs of a disease which is called 'dental caries' or 'tooth decay' and an area of rot is called "Cariou lesion". It is disease of calcified tissue of the teeth characterised by remineralisation of the inorganic portion and destruction of organic substance of the tooth. (1)

Maintaining proper hygiene is essential if you want to feel confident, smell good, and look good. Herbal tooth powders are readily available and come in a variety of colors. Information regarding the active ingredients and dosages of factory tools used in medicine is lacking in many studies. These instruments may be non-crystal or crystal-like. They are thought to be the most traditional and straightforward method of taking medication.

Tooth powder contributes to a healthy and clean mouth. By removing food particles

and plaque from your teeth, it helps to avoid issues like cavities, gum disease, and discolored teeth. People are becoming more aware of the advantages of using herbal tooth powder. However, it's critical to regulate and guarantee the purity of herbal products due to the wide range of ingredients and quality. Many types of herbal tooth powder with various natural ingredients are available. Because they are regarded as safe, efficient, and less hazardous, people have faith in products made from herbs, like toothpowders.

The herbs are antibacterial and promote blood flow to the gums, while calcium and trace minerals aid in the restoration of dental enamel. Herbal tooth powder is highly valued for both its extended shelf life and exceptional quality. In India, the practice of cleaning teeth with powdered materials like salt, charcoal, and brick has long been common, especially in rural areas.

Brushing and flossing remove plaque from teeth. A sticky, yellowish-white film called plaque develops on teeth if it is not removed. It solidifies into tartar when oral bacteria come together. Cavities, gingivitis, and tooth loss can all be caused by plaque. Plaque is removed and teeth are protected by routine dental examinations. Food sticks to the teeth, and when bacteria interact with the food particles, plaque is created. Although they should clean teeth, abrasives shouldn't harm gums or enamel(2).

Literature Survey:

Tooth powders are used in conjunction with toothbrushes to prevent tooth decay and maintain oral hygiene, including freshness of breath. In order to overcome the negative effects of the standard tooth powder set up by union fixings, this work was done to prepare tooth powders that can be used as a

tool for proper verbal cleanliness. The toothpastes were arranged by utilizing different home grown fixings which possess the anti-bacterial, clean and cooling properties. The arranged tooth powder was assessed for its organoleptic and physical characteristics such as colour, arrange, taste, formability, pH, dampness substance, stream property, bulk thickness and in-vitro anti-microbial action to guarantee that it possesses all the specified prospects to employments against the dental maladies. The comes about were found to be inside the allowed limits.²The tooth comprises of two parts, the crown and the roots. The crown of the tooth is secured by an external surface called finish and it is the hardest tissue within the tooth. The major composition of finish is hydroxyl apatite other than that it comprises of water and keratin. Dentine is the beneath portion of the finish which could be a composite of hydroxyl apatite. Verbal comprises of not as it were tooth but too spit for simple to devour the nourishment. Spit is the major element proposed for grease up the food and to preserve an suitable environment within the mouth. Spit is shaped by different organs such as labial, lingual, buccal, and palatal are the bigger and littler organs that create spit persistently to keep the tooth environment in the energetic state. Home grown tooth powder has been around for centuries and numerous accept it to be an basic portion of any teeth cleaning regimen. Natural product have been as of late explored more altogether as promising specialists for the anticipation of verbal illnesses, particularly plaque-related illnesses such as dental caries due to side impacts of the utilize of a few perilous chemicals in the foremost of the promoted toothpastes and powders which has created

disturbing circumstance, particularly among the children.⁽³⁾

Herbal tooth powder consisting of various ingredients that are available in the market in a wide range. Home grown tooth powders have been utilized for centuries in different societies as a implies to clean teeth, refresh breath, and keep up gum wellbeing. Hence modern methods focusing on these aspects are useful for the standardization of herbs and their formulation. Fixings such as neem, clove, mint, and fennel are commonly found in these definitions, each contributing one of a kind benefits. For occasion, herbal preparation is known for its antibacterial properties, torment alleviation, and gives a refreshing taste.

Oral health is essential to good health and quality of life.” - WHO fact sheet on oral health⁽⁴⁾

Dentifrice is a preparation for cleansing and polishing the teeth. There are two types of dentifrices, one is simple cleansing dentifrice and another is therapeutic dentifrice. ⁽⁵⁾

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tissue within the tooth. The major composition of finish is hydroxyl apatite other than that it comprises of water and keratin. Dentine is the under portion of the finish which could be a composite of hydroxyl apatite. Verbal comprises of not as it were tooth but moreover spit for simple to consume the nourishment. Spit is the major component proposed for grease up the nourishment and to preserve an fitting environment within the mouth. Spit is shaped by different organs such as labial, lingual, buccal, and palatal are the bigger and littler organs that deliver spit ceaselessly to keep the tooth environment within the energetic state.(6)



Types of Tooth Powder

1. Whitening Tooth Powder: This type of powder helps gums, freshens breath, and lessens mouth inflammation. It is used to whiten and polish teeth.
2. Natural Tooth Powder: This powder contains ingredients like sea salt, which acts as an abrasive, natural chalk, and some essential oils, such as eucalyptus and peppermint.

3. Herbal Tooth Powder: This powder is also beneficial for sore or bleeding gums. can contain a range of ingredients. Common ingredients include white clay, powdered chalk, and baking soda. Many consider herbal tooth powder, which has been used for centuries, to be a crucial component of any teeth-cleaning routine.

4. Homemade Tooth Powder: You may also make these powders at yourself. Herbal tooth powder prepared at home can be advantageous since it may be less expensive and the maker will be aware of the components he or his children are consuming(7).

Methods and Material:

Ingredients –

Ingredients	Quantity
Black Pepper	50gm
Alum	100gm
Salt	20gm
Earthpigment	30gm

Methods :

DESCRIPTION OF EXCIPIENT PROFILE AND HERBAL INGREDIENTS

The profile of herbal ingredients and excipients was gathered from the nearby marketplace

SELECTION OF HERBAL COMPONENTS

A thorough selection of herbal substances with a reputation for health benefits should be incorporated into the composition. Herbs like Black pepper, Alum, Salt, Earthpigment may be among them.

SELECTION OF EXCIPIENT PROFILE

Select a base material that will clean teeth with a mild abrasive action without being too harsh on the enamel. Examples of such materials include Alum and Salt.

PREPARATION OF THE TOOTH POWDER

After drying in the shade, the herbal ingredients were ground into a powder with a mixer. The herbs that have been powdered are then put through a sieve device with extremely small pores, making it easy to mix and store in an airtight container. In the formulation of herbal tooth powder, the powdered herbal ingredients are compiled.

Evaluation Tests:

1. **Color:** The prepared tooth powder's color was assessed. Visual inspection was done on the color.
2. **The odor.** The product's odor was detected by sniffing it.
3. **Taste:** The product was tasted in order to manually assess the taste.
4. **Stability:** To test for stability, the product was kept at various temperatures.
5. **Spreadability:** By manually spreading the powder, spreadability was assessed.
6. **Abrasiveness:** An assessment was conducted by hand.
7. **Foamability:** A small amount of preparation with water was placed in a measuring cylinder, and the initial volume was recorded in order to assess the product's foamability.

A.Organoleptic Evaluation

Parameters	Method	Result
Colour	Colour was checked visually	Brown

Odour	Odour was checked by smelling the product.	Pungent odour
Taste	Taste was checked manually by tasting the product.	Salty, Spicy and Astringent
Texture	Texture was evaluated in relation to product quality	Fine and Soft

B. Rheological Evaluation

Moisture Content:

Ten grams of tooth powder were weighed, dried in an oven set to 105°C, and then cooled. Using the provided formula, the weight loss is expressed as a percentage of the moisture content. % Moisture content = $\frac{\text{Initial weight of sample} - \text{Final (Dry) weight of Sample}}{\text{Initial Weight of Sample}} \times 100$. The moisture content of the given tooth powder sample is less than 2%.

Angle of Repose:

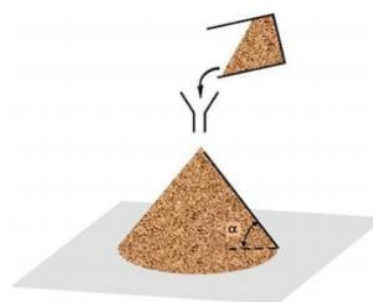


Figure 4: Angle of repose.

It is determined by heap method. Powder is poured through a funnel from a definite distance to the smooth horizontal surface until a heap of maximum height is formed in a conical form. The diameter and the of

the heap is determined by following expression:

$$\text{Angle of repose } (\theta) = \tan^{-1} \frac{h}{r}$$

Table No. 3: Angle of Repose.

Angle of repose (θ)	Type of flow
25	Excellent
25-30	Good
30-40	Passable
>40	Very poor

Where 'h' is the height of heap and 'r' is the radius heap made by powder.

The table shows,

- The powder having angle of repose 25 exert an excellent powder flow.
- The powder having angle of repose between 25-30 exert good powder flow. The powder having angle of repose between 30-40 exert passable powder flow,
- The powder having angle of repose greater than 40 exert very poor powder flow.

Foaming index:

It is determined by taking 10 ml of 1% w/v dispersion of tooth powder in 100 ml measuring cylinder. The dispersion is stirred mechanically for 30 minutes for creating the foams. When the maximum foams are produced, the volume occupied by the foams is recorded and the mean of the three respective observation is recorded. Result calculated by measuring the height of foam developed in the measuring cylinder.

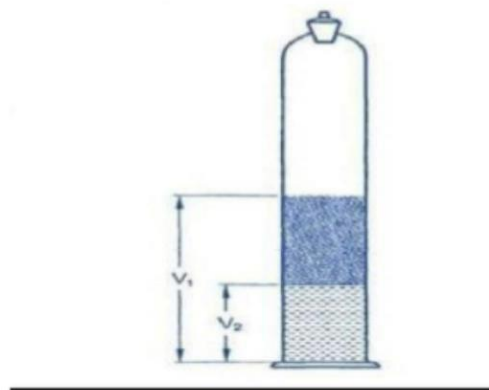


Fig: Foaming Test Apparatus.

Determination Of Foaming Character

1 g of drug taken in 500 ml conical flask containing 100 ml of boiling water. Moderate boiling temperature maintained for 30 minutes. Cooled and filtered in 100 ml volumetric flask and volume made up to 100 ml with water. The decoction poured into 10 test tubes in successive portions of 1-10 ml and the volume of each test tube made up to 10 ml with water. Then test tubes shaken for 15 seconds and allowed to stand for 15 minutes and the height of the foam measured. The foaming index calculated according to the height of foam observed in every test tube.

The normal foam was created.

Spreadability:

A powder's complex characteristic features, which are clearly influenced by particle properties, are assessed by manually spreading the powder. This prevents empty patches, agglomerates, and uneven surfaces from forming and enables the powder to be distributed evenly as a thin layer of a few multiplies of particle size.

The powder is spreadable.

Determination of pH:

Firstly, we weigh 1gm of sample and the mixed it in 10ml beaker with diluent water. Then calibrated the PH meter with standard alkali solution 7Ph alkali solution. After we have taken the sample measured the PH. is 7.

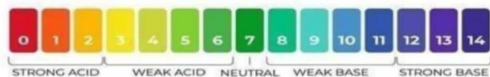


Fig: pH Scale

Limit test for Tooth Powder –

Limit Test :

A limit test is an analytical procedure used to identify and control trace impurities in chemical substances by comparing the sample's reaction to that of a standard.

Purpose: Ensure impurities are within acceptable limits.

Common limit test:

Limit test for Halides-

Reagent:Silver Nitrate

Observation:White Precipitate

Limit test for Chloride-

Reagent:Manganese Oxide

Observation-Green Fumes Produced

Limit test for Bromine-

Reagent:Manganese Oxide

Observation-Brown Fumes

Limit test for Iron-

Reagent:Lead Acetate

Observation-Yellow Precipitate

Limit test for Sulphate-

Reagent: Barium Chloride

Observation-White Precipitate

Limit test for Nitrates-

Reagent:Sulfuric Acid

Observation-Yellow brown vapours of NO₂ pungent odour

Limit test for Acetate-

Reagent: Sulphuric acid, ethanol

Observation-friuty smell of ethyl acetate

Limit test for Carbonate -

Reagent:Nitric Acid

Observation-Effervesence of CO₂ gas

Conclusion

The study "Development and Evaluation of Natural Tooth Powder: A Sustainable Alternative to Synthetic Formulations" concludes that the formulation and evaluation of herbal tooth powders offer a promising alternative to synthetic dental products. This project developed a tooth powder using a combination of herbal ingredients like neem, clove, turmeric, and cinnamon, chosen for their antimicrobial, anti-inflammatory, and astringent properties. The research highlights the product's effectiveness in maintaining oral hygiene by reducing dental plaque, preventing cavities, and promoting gum health.

The prepared tooth powders were tested for various parameters, including pH, moisture content, bulk density, abrasiveness, and foaming index. Results confirmed the product's suitability for oral use, meeting acceptable limits in all tests. The herbal formulation provides a safe, natural alternative for consumers concerned about the side effects of chemical-based dentifrices. Furthermore, this study

reinforces the growing importance of traditional herbal remedies in modern oral care, aligning with global trends favoring natural health products.

These findings underscore the potential of herbal tooth powders as a sustainable, effective, and consumer-friendly solution for dental care, bridging traditional wisdom with contemporary scientific practices.

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