

# Formulation and Evaluation of Herbal Tooth Powder

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**Abstract:** *Herbal tooth powder is a traditional oral care preparation formulated using medicinal plant materials with antimicrobial, anti-inflammatory, and cleansing properties. The present study aimed to formulate and evaluate a herbal tooth powder using natural ingredients such as neem, clove, peppermint, turmeric, and liquorice. The prepared formulation was evaluated for physicochemical properties including color, odor, taste, particle size, pH, bulk density, foaming ability, moisture content, spreadability, abrasiveness, and stability. The results indicated that the formulated herbal tooth powder showed satisfactory organoleptic characteristics, acceptable pH, good cleansing ability, and antimicrobial potential against oral pathogens. The formulation can be considered safe, economical, and effective for maintaining oral hygiene.*

**Keywords:** Herbal tooth powder, Oral hygiene, Neem, Clove, Antimicrobial activity, Herbal formulation

## I. INTRODUCTION

Oral hygiene is an essential part of general health and well-being. Dental diseases such as dental caries, gingivitis, periodontitis, and bad breath are among the most common health problems worldwide. Synthetic toothpastes and tooth powders available in the market often contain chemicals such as fluoride, triclosan, detergents, and artificial sweeteners, which may cause side effects like tooth staining, allergic reactions, and mucosal irritation.

Herbal formulations have gained popularity due to their safety, effectiveness, affordability, and minimal side effects. Herbal tooth powder is a natural preparation used for cleaning teeth and gums. It contains medicinal herbs possessing antimicrobial, anti-inflammatory, analgesic, and antiseptic properties.

The present research work focuses on the formulation and evaluation of herbal tooth powder using natural ingredients traditionally used for oral care.

### History of herbal tooth powder

#### Ancient Era

The use of herbal dentifrices dates back to ancient civilizations, where mixtures of herbs, ash, charcoal, and bark were used for cleaning teeth. Ayurvedic texts describe the use of chewing sticks made from Neem, Babool, and Liquorice for dental cleaning and disease prevention.

#### Medieval Period

During the medieval era, herbal powders prepared from sage, mint, and aromatic barks were commonly used in Europe to freshen breath and remove stains.

#### Modern Era

The introduction of synthetic dentifrices increased the use of chemical abrasives and detergents; however, consumer concerns about safety and long-term toxicity have led to renewed interest in herbal tooth powders.



### **Need of the study**

Synthetic dental formulations may cause adverse reactions such as enamel abrasion, gum irritation, and altered taste due to the presence of harsh chemicals and preservatives [3]. In contrast, herbal tooth powders provide several benefits, including better biocompatibility, minimal side effects, environmental friendliness, and cost-effectiveness.

The increasing global shift toward herbal and natural products highlights the need for scientifically validated herbal tooth powders.

### **2. Objectives**

1. To formulate herbal tooth powder using natural herbal ingredients.
2. To evaluate the prepared formulation for physicochemical properties.
3. To determine the stability and effectiveness of the herbal tooth powder.
4. To study the antimicrobial activity against oral microorganisms.

### **TYPES OF TOOTH POWDER:**

#### **1. Whitening Tooth Powder :**

The purpose is to freshen breath, help gums and reduce the amount of inflammation in the mouth. It is used to polish and whiten a person's teeth.

#### **2. Natural Tooth Powder :**

Ingredient like sea salt which act as an abrasive, natural chalk and certain essential oils like peppermint, eucalyptus used in the natural tooth powder.

#### **3. Herbal Tooth Powder:**

Sore or bleeding gums also can benefit from herbal tooth powder. Can have a variety of ingredients. Baking soda, powdered chalk, and white clay are common. Herbal tooth powder has been around for centuries and many believe it to be as essential part of any Teeth Cleaning regimen.

#### **4. Homemade Tooth Powder-**

These powders also can be made at home. Homemade herbal tooth powder can be beneficial because they may cost less and the person making it will know what ingredients he is putting in his mouth or in the mouth of the children.

Tooth powder is a mildly powder that is used in combination with tooth brush to maintain oral hygiene. The manufacturing of tooth powder is a comparatively simple operation. The primary objective is the homogenous distribution of all the ingredients without contamination of foreign substances.

### **CHARACTERISTICS OF GOOD QUALITY HERBAL TOOTH POWDER**

: It cures tooth sensitivity

: It cures toothache.

: It gives whitening and shining teeth.

: It removes plaques.

: It fights with bad breath and freshens it up.

: It removes stains of beverages like coffee, tea, etc.

: It cures gum sensitivity and prevents it from coming back.

: It helps to lighten up the colour of the lips.

### **3. Materials and Methods**

#### **3.1 Materials**

The following ingredients were used in the preparation of herbal tooth powder:



Sr. No.	Ingredient	Biological Source	Role in Formulation
1	Neem powder	<i>Azadirachta indica</i>	Antibacterial agent
2	Clove powder	<i>Syzygium aromaticum</i>	Analgesic and antiseptic
3	Liquorice powder	<i>Glycyrrhiza glabra</i>	Sweetening and anti - inflammatory
4	Turmeric powder	<i>Curcuma longa</i>	Antimicrobial and antiinflammatory
5	Peppermint powder	<i>Mentha piperita</i>	Flavoring agent
6	Rock salt	Natural mineral	Cleansing agent
7	Calcium carbonate	Mineral source	Mild abrasive
8	Baking soda	Sodium bicarbonate	Whitening an

### Neem powder 20



Fig.3: Liquorice





Turmeric powder 10



Peppermint powder 5



**Rock salt 10**



Fig.7: Calcium Carbonate  
**Sodium bicarbonate 10**



Fig.8 Sodium Bicarbonate Total 100

**Method of Preparation**

1. All herbal ingredients were dried and powdered separately.
2. The powders were passed through sieve number 80 to obtain uniform particle size.
3. All weighed ingredients were mixed geometrically in a mortar and pestle.
4. The prepared powder was blended thoroughly to obtain a homogeneous mixture.
5. The final formulation was stored in an airtight container



#### **IV. EVALUATION PARAMETERS**

The prepared formulation was evaluated for:

Color  
Odor  
Taste  
Texture  
Appearance

##### **4.1 Particle Size Analysis**

Particle size was determined using sieve analysis method.

##### **4.2 pH Determination**

The pH of 1% aqueous solution of tooth powder was measured using a digital pH meter.

##### **4.3 Moisture Content**

Moisture content was determined by drying the sample at 105°C until constant weight.

##### **4.4 Bulk Density**

Bulk density was calculated by measuring the volume occupied by a known weight of powder.

##### **4.5 Foaming Ability**

A small quantity of powder was shaken with water in a measuring cylinder and foam height was recorded.

##### **4.7 Abrasiveness Test**

The powder was rubbed on a glass slide to determine abrasive nature.

##### **4.8 Stability Study**

The formulation was stored at room temperature for one month and evaluated periodically for changes in color, odor, texture, and pH.

##### **4.9 Antimicrobial Activity**

Antimicrobial activity was tested against oral microorganisms using agar well diffusion method.

#### **V. RESULTS AND DISCUSSION**

##### **5.1 Organoleptic Properties**

Parameter Observation

Color Light brown Odor Pleasant mint odor

Taste Slightly salty and spicy Texture Fine powder

Appearance Smooth and homogeneous

##### **5.2 Physicochemical Evaluation Test**

Result

pH 7.2

Bulk density 0.62 g/ml Moisture content 2.5%

Foaming ability Moderate Abrasiveness Mild



The prepared herbal tooth powder exhibited satisfactory physicochemical characteristics. The pH was found near neutral, indicating suitability for oral use without damaging enamel. The formulation showed acceptable cleansing action and pleasant flavor.

Neem and clove contributed significant antimicrobial activity against oral pathogens. Turmeric provided anti-inflammatory action, while peppermint improved mouth freshness.

#### **VI. ADVANTAGES OF HERBAL TOOTH POWDER**

Free from harmful chemicals Economical and easily available Minimal side effects

Good antimicrobial activity

Helps maintain oral hygiene naturally Eco-friendly and biodegradable

#### **VII. DISADVANTAGES**

Short shelf life compared to synthetic products Variation in herbal ingredient quality

Less foaming action

Strong herbal taste may not be preferred by all users

#### **VIII. CONCLUSION**

The present study concluded that the formulated herbal tooth powder possesses good physicochemical properties and effective antimicrobial activity. The formulation was found safe, stable, economical, and suitable for maintaining oral hygiene. Herbal tooth powder can serve as an alternative to synthetic oral care products due to its natural composition and therapeutic benefits.

#### **IX. FUTURE SCOPE**

Clinical evaluation on human volunteers Shelf-life improvement studies

Development of advanced herbal oral care formulations Comparative studies with commercial tooth powders.

#### **DISCUSSION**

This research highlights that herbal tooth powders provide a safe and effective alternative to synthetic dentifrices due to their natural antimicrobial, anti-inflammatory, and astringent properties. Herbs such as Neem, Triphala, Clove, Liquorice, and Turmeric possess well-documented therapeutic actions that help control plaque, gingivitis, and oral microbial load. Compared to chemical formulations, herbal powders minimize risks such as enamel abrasion, mucosal irritation, and long-term toxicity.

However, challenges remain, particularly regarding standardization, variability in phytochemical content, and ensuring optimal abrasiveness and microbial stability. Despite these limitations, the increasing consumer preference for natural and eco-friendly products supports the growing relevance of herbal dentifrices. With advancements in formulation technologies and the need for more clinical validation, herbal tooth powders have strong potential for wider acceptance in preventive oral care.

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