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DEVELOPMENT AND EVALUATION OF A HERBAL BASED ORAL CARE SYSTEM FOR PROMOTING ORAL HEALTH

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ABSRACT

Toothpaste is a popular product used by everyone. Toothpaste is commonly used to clean the teeth and mouth. It is also used to treat a variety of dental diseases. Many dentists recommend using toothpaste to alleviate conditions such as sensitivity and chronic gingivitis. Toothpaste is a popular product used by everyone. Toothpaste is commonly used to clean the teeth and mouth. It is also used to treat a variety of dental diseases. Many dentists recommend using toothpaste to alleviate conditions such as sensitivity and chronic gingivitis. Herbal toothpastes can be evaluated using various tests, including physical examination, relative density, abrasiveness, spreadability, pH determination, homogeneity, foaming, stability, moisture and volatile matter, foaming character, organoleptic evaluation, pH, fragrance test, shape retention, and storage stability. Herbal toothpaste is made with herbs such as nosadar, mint, camphor, cardamom, neem, sendha namak, dry ginger powder, geru, clove, black pepper, and alum stone.

KEYWORDS: Toothpaste, Chronic gingivitis, Dental disease.

INTRODUCTION

Utilizing any part of plants for therapeutic and disease-treating purposes is known as herbal medicine. The World Health Organization (WHO) estimates that around 80% of people worldwide utilize herbal medications for primary healthcare, demonstrating the widespread usage of herbal remedies throughout human history.[1] Furthermore, it has been documented that over 35,000 plant species are utilized medicinally in a variety of human cultures worldwide.[2] Strong antibacterial, anti diabetic, antiviral, anticancer, and anti-fungal properties are possessed by a few of them. The most prevalent kinds of infections are those that affect the oral cavity. Enamel and dentine are harmed and infected by dental caries, an infectious disease.[3] The infection worsens and eventually causes tooth loss if treatment is not received. Commonly used products that enhance oral hygiene include toothpaste, toothbrushes, and mouthwash that include antimicrobial agents. Their applications have existed since antiquity and are still in use today.[4] Toothpaste is a gel or paste toothpaste that is used in conjunction with a toothbrush as an accessory to clean and maintain the health of teeth in order to improve oral hygiene.[5] It is an indispensable component of an efficient home care system. One of the most widespread oral conditions in the world is chronic gingivitis. The primary etiological and starting factor for gingivitis development is dental plaque. Due to the limitations of mechanical methods, toothpaste that contains safe and effective medications to prevent gingivitis is also seen to be a good adjunct to mechanical plaque control.[6]

- **AIM –** To develop and evaluate a herbal based oral care system for promoting oral health.

- **OBJECTIVE**

1. To combine herbs with proven advantages for oral health in order to create and assess a herbal-based toothpaste.
2. To evaluate the product's antibacterial efficacy against oral pathogens.
3. To look into the product's antioxidant and anti-inflammatory qualities.
4. Gums are strengthened.
5. Dental hypersensitivity is effectively reduced by this combination.

- **MATERIAL AND METHOD**

Plants Materials

1. Neem:- **Common name** :-Neem, Nimtree, Kadulimb
Botanical Name:- *Azadiarachta indica.*
Biological source:-Neem consist of the fresh or dried leaves and seed oil ***Azadiarachta indica.***
Geographical Source: While some claim that neem is indigenous to the whole Indian subcontinent, others ascribe it to arid forest regions Uses: It promotes the production of saliva. By washing away bacteria and any food particles that could harbor them, saliva serves as a natural mouthwash.
across South and Southeast Asia, such as Pakistan, Sri Lanka, Thailand, and Malaysia.
Uses:- Neem is used to cure gum disease, prevent cavities, and eliminate oral germs due to its antibacterial qualities. In addition to treating skin, teeth, and other health problems, neem can aid with tooth decay, oral infections, bleeding, and damaged gums. The leaves, seeds, bark, stems, oil, and phytochemicals of neem possess anti-fungal, antiviral, anti parasitic, and antibacterial qualities.

2. Clove:- **Common name**:- clove flower, clove buds, long.
Biological name:- Clove consists of dried flower buds of Eugenia caryophyllus.
Family:- *Myrtaceae.*
Geographical source:-The Amboyna and Molucca islands are the geographical source. Nowadays, the Caribbean islands, Sri Lanka, Madagascar, Pemba, Penang, Zanzibar, and India are the main places where it is grown. The Nilgiri, Tenkasi Hills, and Kanyakumari district of Tamil Nadu state are the growing regions for cloves in India.
It is also grown in Kerala's districts of Kottayam and Quilon.
Uses: Clove has antibacterial, carminative, stimulant, flowering, dental analgesic, and fragrant properties. Although there isn't any solid scientific proof to back up these claims, people frequently utilize cloves to treat toothaches, dental work pain, dental plaque, and a host of other ailments.

3. Rock salt:-Synonyms:-Sendha namak, Halite, Rock salt.
Biological source:- When salt water from a lake or sea evaporates, colorful sodium chloride crystals are left behind, forming sendha namak, a sort of salt.
Uses:- Rock salt helps stabilize blood pressure by preserving a balance between high and low blood pressure, provides all the necessary nutrients, and significantly strengthens the body's immune system. It also helps with digestion and is a natural remedy for stomach pain.

4. Mint:- **Synonyms**:-Pudina, Mentha oil, Colpermin.
Biological source:-It is obtained from fresh leaves and flowering tops of the plants known as *Mentha piperita Linn*.
Uses: It promotes the production of saliva. By washing away bacteria and any food particles that could harbor them, saliva serves as a natural mouthwash.
Family:- Labiatae

5. Cardamom:-Synonyms:-cardamon, Queen of spices.
Biological source:-it is dried ripe fruit of *Elettaria cardamomum.*
Family:-*Zinziberaceae.*
Uses:-cardamom is used in anti bacterial and anti inflammatory properties, which can help fight bad breath, prevent cavity, and maintain oral health.
Geographical source:-Cardamom is native to the evergreen forests of the western ghats in south India, specifically in the states of Kerala, Karnataka, and Tamil Nadu.

6. Pellitory:-**Synonyms:-** karkara, Mayweed, Romen pellitory.
Biological source:-It is obtained from fresh leaves and fruit of the plant is known as *Anacyclus pyrethrum*.
Family:-*Asteraceae.*
Geographical source:- it is indigenous to portions of North Africa and Mediterranean Europe, although it is also found in India, Pakistan, and other places.
Uses:-It is used to mouthwash improve breath, lessen gum irritation, and combat bacteria. karkara is an excellent supplement for dental health because of its anti-inflammatory and antibacterial qualities, particularly for those who have irritated gums.

7. Geru:- Red ochre, or geru, is sometimes added in toothpaste, especially in Ayurvedic formulations, because of its iron concentration, which is thought to fortify teeth and gums. Nonetheless, its main function in toothpaste is not to clean or whiten teeth, but rather to promote oral health by fortifying gums and possibly preventing oral infections.

8. Black pepper:- **Synonyms:-**Kali mirch, Gol mirch.
Biological source:-It consist of dried unripe fruits of *Pepper nigrum*.
Family:-*Piperaceae.*
Uses:- its used to the antibacterial and anti-inflammatory qualities, it is used to treat gingival irritation, toothaches, and dental hygiene.

Geographical source:- it is indigenous to India's Malabar Coast, especially the Western Ghats.

9. Sounth:- **Biological source:-**Sounth which refers to ginger, comes from the rhizome of the *Zingiber officinale* plant.
Family:- *Zingiberaceae.*
Uses:- Antimicrobial properties that help regulate hygiene, fights with bad breath, anti inflammation and prevent bleeding gums.
Geographical source:-Southeast Asia is where ginger is native. India is the world's largest producer and exporter, with states like Kerala, Karnataka, and others in the northeast serving as important growing regions.

10. Muski kapur:- The kapur tree *(Dryobalanops sp*.), a tall timber tree from South East Asia, and the camphor laurel *(Cinnamomum camphora),* a massive East Asian evergreen tree, both contain it. Ocotea usambarensis is the most notable of several other similar trees in the laurel family that possess it.
Uses:- Its cooling and calming properties make it suitable for use in toothpaste formulas, especially for moderate tooth pain. A natural substance called camphor may offer momentary pain and inflammation relief.

11. Nosadar:- uses:- it is used as a cleaning agent and maintained PH of toothpaste.

12. Calcium carbonate:- Uses:- calcium carbonate serves as a mild abrasive, thickening, and polishing agent, assisting in tooth cleaning and polishing without causing enamel damage. Additionally, it adds to the toothpaste's stability and consistency.

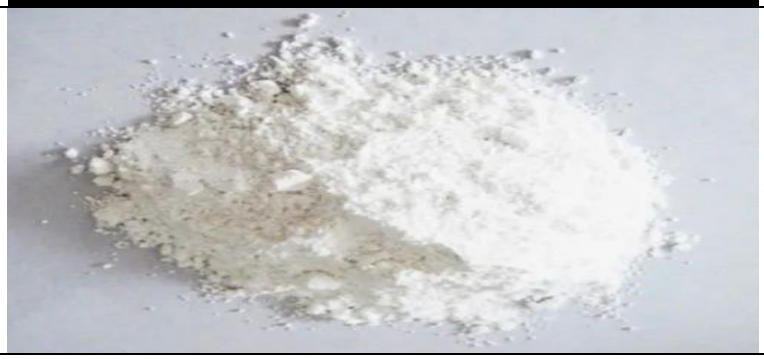
13. Alum stone:- Uses:- Alum stone also known as potassium alum, has astringent and antibacterial qualities. It can be used in toothpaste to help strengthen gums It stop tooth decay, and manage bleeding gums. For these advantages, alum is a special ingredient in some toothpastes.

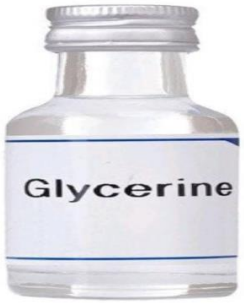
14. Glycerin:-uses:- As a humectant, toothpaste's glycerin keeps it moist and stops it from drying out. It also gives the toothpaste a creamy, smooth feel that makes spreading and applying it simpler. Glycerin also helps preserve the integrity of the toothpaste mix and enhances oral flavor.

- **INGREDIENTS**

Sr. No.	Ingredient	Images
1.	Mint	
2.	Ginger powder	

3.	**Nosadar**	
4.	**Neem**	
5.	**Sendha Namak**	
6.	**Cardamom**	
7.	**Geru**	

8.	**Clove**	
9.	**Black pepper**	
10.	**Alum Stone**	
11.	**Camphor**	
12.	**Calcium Carbonate**	

13.	**Glycerine**	
14.	**Pellitory**	

- **Evaluation of toothpaste**

1. **Physical evaluation**

a) **Color -** The color of the toothpaste formulation was evaluated. The color was examined visually.

b) **Odour-** The product odour was discovered by smelling it.

c) **Taste -** The formulations flavour was manually assessed by tasting it.

2. **Abrasiveness -** The content was placed on the finger. Then scratch on the butter paper for 15 - 20 cm. This process was repeated for 10 time.
3. **pH measurement** - 10 g of toothpaste was taken in the 50ml beaker. Then 10ml freshly boiled and cooled water was added by continuous stirring. After 5min. pH was determine.
4. **Moisture content** - 5g toothpaste was taken in porcelain dish having a diameter of 6-8cm, depth 24cm. At 105 degree calcius, dry it.
5. **Ash value** - Take 5g of toothpaste in china dish. Place the china dish in desicator for 6 hours at 450 degree Celsius. Ash value can be calculated by using formula.
6. **Loss of drying powder** - Weigh 1g powder in a china dish. Placed it in hot air oven at 105 degree calcius for 4-5 hours. Cool and weight it.
7. **Foaming index** - 1g of powder is dissolve in 10ml of distilled water in conical flask. Warm it for half an hours at 85 degree celsius. Check the temperature and filter out it. Make 10 dilution. Using 10 test tubes (1ml, 2ml, 3ml, ……. 10ml). shake the dilution continuously for 5minutes. Check the height of the foam.
8. **Swelling index** - 1g drug was taken in the measuring cylinder and volume male upto 25ml and left for 6-7 hours. Now calculate the reading.

$$\text{Swelling index} = \frac{\text{Volume of swelling material - Original volume of liquid}}{\text{Weight of drug material}}$$

9. **Anti - microbial activity** - Disc diffusion method was used to check an in- vitro anti - bacterial test of plate. E- coli cell were first grown, they tended to multiply in agar plate. Plates were streaked with inoculum first. Then 5mm diameter bores were created into the medium with sterile cork barer. The agar plates surface was rotated to provide an even dispersion of inoculum throughout the hole. The prepared paste were added into the bores of cultured plates. The plates were wrapped in paraffin, labeled and incubated for 24 hours at 37 degree Celsius. After 24 hours incubation period, each plates was examined. The diameter of zone of inhibition was measured in micrometer with rules.

Anti-microbial activity of E.coli

Culture	Minimum inhibition concentration	Result
E.coli	0.1mg/ml	Sensitive

- **RESULT**

Sr.no.	Evaluation	Result
1.	Color	Reddish brown
2.	Odour	Characteristics
3.	Taste	Slightly salty
4.	Abrasiveness	Present
5.	pH	7.5
6.	Moisture content	12.2
7.	Ash value	0.91
8.	Foam	Nill
9.	Solubility	Good

- **CONCLUSION**

The study came to the conclusion that herbal tooth powders are safer than synthetic preparations, have at least three less adverse effects, and are more widely accepted in dentistry research. The tooth powder

formulation exhibits antimicrobial activity against infections and is capable of maintaining dental and oral hygiene. The developed herbal tooth powder has a bright future in the study of natural therapies and public dental health. One significant source for bacterial pathogen prevention is natural plant compounds. As a result, a herbal tooth powder was created for the current study and tested for antibacterial activity; the results were excellent. As indicated by its results as an efficient tooth powder, the components employed in this work were examined and chosen to have an antibacterial impact and to preserve oral hygiene. It does not produce any detrimental effects, instead, it imparts good freshness and away from foul Odour. Herbal tooth powder is a dependable, secure, and affordable method of maintaining oral hygiene.

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