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Formulation and Evaluation of Natural Herbal Toothpowder from locally available herbal Plants

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Abstract

Herbal tooth powder has been utilized for centuries and many believe it to be an essential part of any teeth cleaning regimen. The aim of the present work was to formulate the herbal tooth powder for prevention of plaque on the tooth surface, dental caries. Spongy and bleeding gums and gingivitis. Tooth powder was prepared from combination of fourteen herbal plant part in the present work and was screened for anti-microbial activity. Antibacterial activity result shows highest result in 400 mg/ ml concentration for both the bacteria i.e. *E.coli* and *S. aureus* than standard powder vithoba. Formulated toothpowder does not cause any harmful effects, instead it imparts good freshness and away from bad odor. Oral hygiene can be maintained in a reliable, safe and inexpensive way by using herbal tooth powder.

Keywords: Herbal tooth powder, homemade tooth powder, oral infection.

1. Introduction

Oral hygiene is an important key to maintain good appearance, impression of an individual and gives confidence. In the present era, a vast interest has developed among the people regarding the potential of natural tooth brushing in preventing and treating the common diseases of oral cavity such as bad odours, tooth decay and plaque. The developed cavity can be mirror image of the body and many systemic illnesses which are manifested in the soft tissue of mucosa of the mouth [1]. As most of the oral diseases are due to bacterial infections and it has been well documented that medicinal plants confer considerable antibacterial activity against various microorganisms including bacteria responsible for dental caries [2].

Herbal dentifrices helps in maintaining good oral health by preventing tooth decay, bad odour from mouth, inflammations in tissues and gums, plaque formation. As oral cavity shows good absorption due to presence

of mucosal membrane, blood tissues and enzymes. Hence an individual should use safe and efficient dentifrices. Most of the synthetic tooth products use fluorides and sodium lauryl sulphate. The fluorides are toxic to human body as they cause neurological and endocrine dysfunction [3-5]. Sodium lauryl sulphate is hazardous and causes irritation in mouth and neurotoxicity in body [3,4,6]. This can be avoided by using an efficient herbal dentifrice.

Herbal tooth powders consisting of various ingredients that are available in the market in a wide range. Hence modern methods focusing on these aspects are useful for the standardization of herbs and their formulations. Consumers believed on herbal-based diseases free toothpowders which are safe, effective, and less toxic. Elujoba *et al.* studied a traditional medicine development for medical and dental primary health care delivery system in Africa and recorded 50 African medicinal plants with oral health implication such as oral hygiene, toothache, sore throat [7]. Similarly, Ismail *et al*. reported a review on botanicals promoting oral and dental hygiene and stated use of natural chewing sticks such as *Salvadora Persica* (Miswak), *Azadirachta indica* chewing of Cloves, mixtures of leaves of Betel, Cardamom and Clove etc to improve dental health and promote oral hygiene [8]. Piper nigrum (Pepper) contains piperine, d-limonene and caryophylline. It has strong anti-inflammatory and antimicrobial activity, it has been used in the treatment of abscesses, tooth ache and avoids decaying of tooth [9].

Present work was carried out to prepare tooth powders which can be used as a tool for proper oral hygiene and to overcome the side effects of the conventional tooth powder prepared by different ingredients. The tooth powders were prepared by using various herbal ingredients which possess the anti-bacterial activity evaluated for in-vitro anti-microbial activity to ensure that it possess all the desired features to uses against the dental diseases.

2. Methodology

All material was collected from the local area. For the preparation of herbal tooth powder, we have selected 14 important ingredients. The powdered herbal materials were sieved through a mesh size. Then all the ingredients mix uniformly to prepare a homogenous formulation.

Table 1: Composition of Herbal Tooth Powder

Sr No	Common Name	*Scientific Name*	Part Used	Quantity
1.	Black pepper	*Piper nigrum*	Seed	4gm
2.	Amla	*Emblica officinalis*	Fruit	4gm
3.	Neem	*Azadiracta indica*	Leaves	4gm
4.	Wada	*Ficus beghalensis*	Areal Roots	4gm
5.	Amba	*Mangifera indica*	Leaves	4gm
6.	Guava	*Psidium guajava*	Leaves	4gm
7.	Jambhul	*Syzygium cumini*	Bark	4gm
8.	Hirada	*Terminalia chebula*	Seed	4gm
9.	Arjun	*Terminalia arjuna*	Bark	4gm
10.	Pimpali	*Piper longum*	Seed	4gm
11.	Zinger	*Zingiber officinale*	Stem	4gm
12.	Behada	*Terminalia bellirica*	Fruit	4gm
13.	Dalchini	*Cinnamomum verum*	Sticks	4gm
14.	Karonti	*Barleria prionitis*	Leaves	4gm

Fig. 1 : fourtween plants are usedin formation of herbal powder

Evaluation of herbal Tooth Powder

The prepared herbal tooth powder was evaluated for its various parameters such as organoleptic, and anti-microbial activity.

1. Organoleptic Evaluation

Organoleptic characteristics for various sensory characters like colour, odour, taste was carefully noted down as illustrated. The raw drugs and powder were separately studied by organoleptic and morphological characters like colour, odour, texture, and appearance.

- **Colour:** The prepared tooth powder was evaluated for its colour. The colour was checked visually under normal lamp.
- **Odour:** Odour was checked by smelling the product.
- **Taste:** Taste was manually checked by tasting the product.

2. Antibacterial Activity

Antibacterial activity of aqueous extract was determine by paper disc diffusion method [10,11]. Sterilized Whatman filter paper no. 1 discs of 5 mm diameter were soaked in respective 200 mg/ml powder and400 mg/ml. 0.2 ml inoculums of test organism was spread on surface of respective bacterial agar plates. Previously soaked discs were placed on surface of inoculated plates. Vithoba Tooth Powder is used as positive control and water was used as negative control. Bacterial plates were initially transferred to refrigerator for 40-45 min to allow diffusion and then transferred to incubator for given incubation period. All the tests were performed in triplicates and under the sterile condition. Zone of inhibition in mm were measured from edge of disc after incubation.

Analysis of data

% Zone of inhibition was calculated by formula.

$$\%\ \text{Zone of Inhibition in mm} = \frac{\text{Zone of Inhibition of Standard tooth powder in mm}}{\text{Zone of Inhibition of prepared tooth Powder in mm}} \times 100$$

Result

1. Organoleptic Evaluation

Distinct parameters were studied such as: Colour, Odour, Taste, Appearance, Solubility and Flow and tabulated in table

Sr.No	Test	Observation
1	Colour	**Greenish Brown**
2	Odour	**Aromatic**
3	Taste	**Aromatic**
4	Appearance	**Powder**
5	Solubility	**Soluble in water**
6	Flow	**Good flow**

Antibacterial Activity

Result of zone of inhibition of formulated powder showed in Plate no.1 It is found that formulated tooth powder showed the resistance activity against all the tested bacterial strain than the standard powder (Vithoba) used in present investigation. Formulated powder showed 34% more zone of inhibition than standard drug for 400 mg/ml concentration against *E coli* Bacterial Strain while it showed 47.3% more zone of inhibition than standard drug for 400 mg/ml concentration against *S.aureus***.** (Table 3)

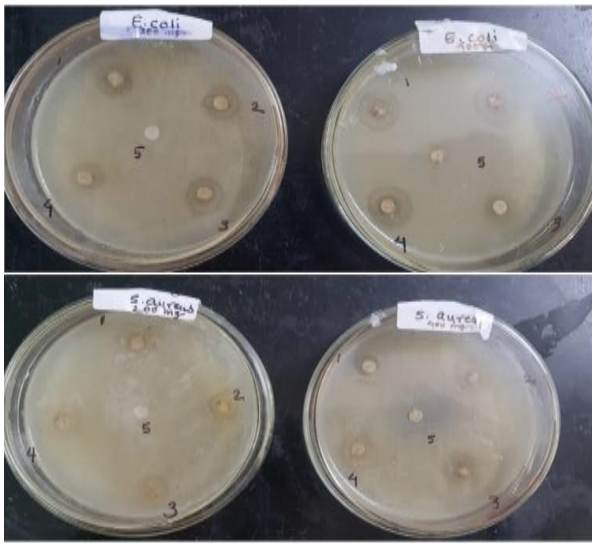

Plate 1 : Disc 1-4 are respective concentration disc and disc 5 is a standard powder disc.

Table 3: % Zone of Inhibition of formulated tooth powder.

	Formulated powder		**Standard Powder (Vithoba)**		**% Zone of Inhibition For 400 mg / ml**
Bacteria	200 Mg/Ml	400Mg/Ml	200 Mg/Ml	400Mg/Ml	
E.Coli	3	4	2	2	34%
	2	5	2	1.5	
	3	5	1	2	
	2	6	1	1.3	
Mean	2.5	5	1.5	1.7	
S.aureus	5	5	1.1	3	47.36%
	3	6	2	3	
	5	6	2.1	2.5	
	5	6	1.5	2.5	
Mean	4.5	5.75	1.65	2.75	

Discussion

The research concluded that herbal tooth powder an emphasizing and more acceptable in dental research and they are safer with minimum side effect than synthetic preparation. The formulated tooth powder capable to the tooth and oral hygiene and show the anti-microbial activity against pathogens. The formulated herbal tooth powder has been good scope in future in nature remedies research and dental health of public. Natural plant products are an important source to control bacterial pathogens. Therefore, in the present study, a herbal tooth powder was developed and evaluated for antimicrobial activity which has shown excellent results.

Conclusion

The ingredients are used in the present work, was screened and selected to possess anti-microbial effect and to maintain oral hygiene as it claimed by its results as effective tooth Powder. It does not cause any harmful

effects, instead, it imparts good freshness and away from bad Odour. Oral hygiene can be maintained in a reliable, safe, and inexpensive way by using herbal tooth powder.

References

1. World Health Organization. Epidemiology, etiology,and prevention of periodontal diseases. Geneva. *Technical report series,* 1978; 621.
2. Jonathan EK, Anna KJ, Johannes and Zulu VS. Medicinal plants with antibacterial activity. *J Ethnopharmacol*.2000; 69: 241-6.
3. Shilpa P, Priya V, Snehal D, Prachi M. Preparation and evaluation of herbal toothpowder. *World Journal of Pharmaceutical Research*, 2019; 8(10): 944-948.
4. Nisha D, Dr. Bharat P, Mohit K. Preparartion, evaluation and comparision study of herbal tooth powder with marketed toothpowder. *World Journal of Pharmaceutical Research*, 2019; 8(7):2225-2238.
5. Domen K, Petra S, and Barbara A. 2016.fluoride: a review of use and effects on health. *Master sociome*, 2016; 28: 133-137
6. Cara A, Julia L, Lauren B, Heidi S, Shannon R, Kay E. 2015. Human and Environmental toxicity of sodium lauryl sulfate (SLS): Evidence for Safe Use in household Cleaning Products. Libertas Academica, doi:10.4137/EHI.S31765.
7. Elujoba et al. Elujoba AA, Odeleye OM and Ogunyemi CM. Traditonal medicine development for medical and dental primary health care delivary system in Africa. *Afr. J Trad. CAM* .2005; 2 (1): 46- 61.
8. Ismail et al. Ismail MYA, Nagwa MA and Zakriya M. Botanicals Promoting Oral and Dental Hygiene: A Review. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*. 2010; 1(2):202-206.
9. Jyotsna S, Lakshmi T. Application of Spices in Dentistry-A Literature Review". *International Journal of Drug Development & Research*, 2014; 6(2).

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