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FORMULATION AND EVALUATION OF HERBAL TOOTH POWDER: THE ORAL HEALTH CARE

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Abstract:

Dentifrices are important in our daily life to maintain good oral health and hygiene. Gingivitis, plaque, periodontal diseases are the crucial problems related to tooth. These major issues are due to poor oral hygiene and negligence in good caring of tooth. This negligence encourages plaque formation on teeth, by causing inflammation of gum tissues which ultimately leads to gingivitis and tooth loss. The oral hygiene can be maintained throughout the day by using various dentifrices prepared by herbal and synthetic ingredients. This work was carried out to prepare a tooth paste which can be used as a tool for proper oral hygiene and to overcome the side effects of the conventional toothpaste prepared by synthetic ingredients. In this study an attempt is made to dispense an alternative to the users by formulating herbal tooth powder using Ginger, Tulsi, Liquorice, Neem, Clove, Camphor, Cinnamon, Activated charcoal and Rock salt. This work was carried out to prepare a tooth powder which can be used as a tool for proper oral hygiene and to overcome the side effects of the conventional tooth powder which can be used as a tool for proper oral hygiene and to overcome the side effects of the conventional tooth powder prepared by synthetic ingredients. Tooth powder is used in combination with tooth brush to maintain the oral hygiene such as freshness of mouth and to avoid tooth decay. In the present work, the herbal tooth powder was formulated and standardized by analysing necessary evaluation parameters such as organoleptic, physical and phytochemical evaluation of herbal tooth powder.

Keywords: Herbal toothpowder, Ginger, Tulsi, Liquorice, Neem, Clove, Camphor, Cinnamon

Introduction:

Plant-based tooth powder help maintain good oral health by preventing tooth decay, bad breath, tissue and gum infections, and plaque build-up. Since the oral cavity is well absorbed due to the presence of mucous membranes, blood tissues and enzymes, it is necessary to use safe and effective toothpowder [1,2]. A wide range of herbal toothpowders are available on the market, composed of different ingredients. Several, pharmacopoeia monographs on plant materials lack identification and quantification of active ingredients he prevention and treatment of periodontal disease is based on controlling plaque build-up primarily through mechanical plaque control methods such as scaling and planning for perfect plaque control. Toothpaste can be used as a prophylactic dental cosmetic to prevent tooth decay and bad breath. It can be made from synthetic and herbal ingredients. Currently, herbal supplements are in high demand due to their effectiveness in preventing side effects compared to synthetic supplements. Toothpaste and toothpaste rely on the abrasive properties of, the paste and powder applied to the tooth to rub against the tooth and help remove food debris and minerals embedded in the tooth.[3,4] The tooth consists mainly of two parts, crown and the root. The crown of the tooth is enveloped by outer surface called enamel and it is the toughest tissue in the tooth. The chief composition of enamel is hydroxyapatite other than that it consists of keratin and water. Herbal

tooth powder has been about for centuries and many believe it to be an essential part of any teeth cleaning regimen. [5]

Natural product has been recently investigated more thoroughly as promising agents for the prevention of oral diseases, especially plaque-related diseases such as dental caries due to side effects of the use of some hazardous chemicals in the most of the marketed toothpastes and powders which has created alarming situation, especially amongst the children. The constituents used in herbal toothpowder has showman-inflammatory action prevents gingivitis), anti-microbial exertion (avoids shrine conformation and tooth decay) and tooth whitening property. They're natural and they've further devisee conduct. The raw accoutrements used to formulate herbal toothpowder have better effect due to the presence of colourful phytochemicals which helps in maintaining oral health and improves natural functions of mortal body.[6] Ocimum basilicum (Tulsi) contains eugenol, linalool, oleanolic acid, Rosmarinus acid. It shows potent anticariogenic property and antifungal activity against two species of candida (i.e., C. albicans and C. tropicalis). It has curative nature against oral infections, tooth ache, leucoplakia and oral submucous fibrosis, pemphigus and folic ulcerations.[7]

Activated Charcoal has the capacity to remove stains, tooth whitening property and acts on acidic plaque, provides fresh odour to oral cavity. Rock salt helps in remineralization of enamel and avoids halitosis, gum diseases, cancer sore and tooth decay.[9] Glycyrrhiza glabra (Liquorice) contains secondary metabolites like saponins, flavonoids, isoflavonoids, chalcones, coumarins, aurones, benzofurans, phenols and stilbenes. It has effective action on prohormones gingival is, oral cancer, dental caries, oral candidiasis, periodontitis and it acts as sweetening agent due to presence of glycyrrhiza.[7,8]

Ideal properties:[10]

- 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

Table no. 1: Ingredients used in formulation with medicinal uses

Sr.No	Ingredients	Botanical name	Images of used material	Uses
1.	Ginger	Zingiber Officinale		Anti-inflammatory
2.	Neem	Azadirachta Indica		Antiseptic
3.	Tulsi	Ocimum basilicum		Bactericidal

4.	Cinnamon	Cinnamomum Zeylanicum		Flavouring agent
5.	Clove	Eugenia cryphyllus		Antioxidant
6.	Liquorice	Glycyrrhiza glabra		Sweetening and foaming agent
7.	Activated Charcoal			Whitening agent
8.	Camphor	Cinnamomum camphor		Refreshing agent
9.	Rock salt	-		Cleaning agent

Table no. 2: Formulation table

Sr.no	Name of ingredient	Quantity (gm)
1	Ginger	12 gm
2	Tulsi	4 gm
3	Liqourice	4 gm
4	Rock salt	1.8 gm
5	Neem	1.5 gm
6	Clove	1 gm
7	Cinnamon	2 gm
8	Peppermint Oil	2 gm
9	Camphor	0.3 gm
10	Charcoal	1.4 gm (30 Gm Total)

Procedure: -
Collection: Collection of herbal ingredients.
Weighing: All the herbal ingredients were weighed according to ascending order of its weight.
Trituration: Weighed ingredients were triturated using mortar and pestle.
Mixing: Mixing of all herbal ingredients together.
Size separation: The powdered herbal materials were sieved through the mesh size 85.
Storage: Store the preparation into the well closed container and store the container in the dry place.

Evaluation of herbal tooth powder:
The prepared herbal tooth powder was evaluated for its various parameters such as organoleptic, physical evaluation .

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, taste, appearance, solubility,flow.
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.

1. Physical Evaluation:-

1.1 Determination of loss on drying:-
2 gm of sample was taken in the oven at 105°C, then cooled. The loss of weight is recorded as percentage loss on drying and calculated by the given formula.
%Loss on drying= weight of sample after drying *100
sample weight

1.2 Determination of pH:-
About 1gm of sample was taken in 25ml beaker. To this 5ml of freshly boiled and cooled water (at 27°C) was added. Stirred well to make a thorough suspension. pH of suspension was determined using pH meter.[13]

1.3 Determination of Bulk density :-
About 10gm of sample was weighed and placed it in dried graduated measuring cylinder and note volume as V1 ml. Cylinder containing sample was placed in bulk density apparatus and operated for 50 tapping. The volume occupied by the powder was recorded as V2 ml and calculated by given formula.
Bulk density = Untapped density - Tapped density

1.4 Determination of flow property [Angle of repose] :-

Clean and dry funnel with round stem of 30 mm diameter with flat tip was taken and attached to the burette stand. Graph paper sheet was placed below the funnel and distance between lower tip of the funnel and sheet was adjusted to height of 2cm. Sample was poured in funnel from top till a heap of powder formed and touched the lower tip of the funnel. Circle was drawn around the heap covering the total sample powder. The average diameter and radius of the circle followed by height was recorded and calculated by using given formula

Θ=tan-1h/r

1.5 Determination of foaming power:-

About 5gm of sample was taken in measuring cylinder with sufficient amount of water. Initial volume was noted and then shaken for 10 mints.

The final volume of foam was noted and calculated by using given formula.

Foaming power = V1-V2

V1 = Volume in ml of foam with water

V2 = Initial volume with water

Result and Discussion :- The prepared herbal toothpowder was subjected to under mentioned evaluation. All results are average of three replicas.

2. Organoleptic Evaluation:-

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

Table no. 3: Observation Table

Sr.no	Parameters	Observation
1.	Colour	Greenish Black
2.	Odour	Aromatic
3.	Taste	Aromatic
4.	Appearance	Acceptable
5.	Solubility	Soluble in Water
6.	Flow	Good Flow

Physical Evaluation :- The physical evaluation such as Loss on drying(%), pH value, Bulk Untapped density, Tapped density, Angle of repose and Foaming power was carried out as per standard method and tabulated in table.

Table no. 4: Physical Parameters and its observations.

Sr.no	Parameters	Observation
1.	Loss on Drying	16%
2.	PH (1%W/W)	7
3.	Bulk Untapped Density	4.5
4.	Tapped Density(gm/ml)	26.5
5.	Angle of Repose	37.2
6.	Foaming Power	3ml

Conclusion:

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-inflammatory. The formulated herbal tooth powder has been good scope in future in nature remedies research and dental health of public. 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. The ingredients used in the present work, was screened and selected to have antibacterial effect and to maintain oral hygiene as it can be claimed by its results as efficient and successful tooth powder. Any herbal tooth powder is considered safe to use twice a day and it does not cause any harmful effects, instead imparts good freshness and away from bad odour.

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