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A REVIEW ARTICLE ON ROLE OF COSMACEUTICALS USED IN DENTRIFRICES

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ABSTRACT

Oral hygiene is one of the major necessities for human beings. The dayto-day life of human beings starts with oral cleaning. So, in this process, toothpaste plays an important role. Various natural herbs can be incorporated to overcome some disadvantages of synthetic cleansing agents. **Aim:** The present work was focused on carrying out the preparation of toothpaste and its evaluation which contained multiple herbs. **Method:** The laboratory scale multi herbal toothpaste formulations were prepared by trituration method whereas initially herbal extracts of neem, clove, betel leaf, peppermint, and turmeric were prepared and suitable excipients were triturated along with herbs to get the consistent mass of multi herbal toothpaste. **Results:** The developed toothpaste formulations were shown good consistency and almost acceptable in vitro evaluation results compared to marketed formulations. The pH of the formulations was around 6.8 and the viscosity of formulation F3 was found around 5645 cps which is a more viscous formulation that showed good extrudability of around the range of 86.2 to 90.4%. The foamability of all the formulations was found good. The spreadability of F2 was found to be maximum at 57.01 g.cm/s. Along with these F1, F2, and F3 formulations showed good abrasiveness and homogeneity properties. **Conclusion:** Considering all the in vitro evaluation results the laboratory-made multi herbal toothpaste formulations showed good and almost equivalent results compared to that of marketed toothpaste formulations. So, the

incorporation of herbs into toothpaste formulations is one of the major advantages while maintaining oral hygiene.

KEYWORD: Herbal toothpaste, Preparation, Evaluation.

INTRODUCTION

Toothpaste formulations are semisolid formulations mainly used for cleaning the oral cavity and maintaining oral hygiene. Nowadays toothpaste is considered a basic need of human beings since the day starts with cleaning the oral cavity. There are many marketed toothpaste formulations available that are developed using synthetic excipients but some formulations are developed using herbal extracts. Various herbs are available around our environments which have the potential to treat various discomforts. Among them, some herbs are also used for oral cleansing purposes. They may be used as antibacterial, antiseptic, odor masking, and teeth whitening. The importance of various herbs was mentioned in Ayurveda. Among the number of available herbs, some suitable herbs have been selected for the development of herbal toothpaste. The incorporation of two or more herbal extracts in a single formulation may yield combined therapeutic effects of those individual herbs. So, it has been more important to incorporate plant-based ingredients in day-to-day life to avoid various side effects from synthetic ingredients.[1-3] The role of toothpaste formulation is to clean and polish the teeth. It keeps oral cavity hygiene clean. Toothpaste has an agreeable taste, and pleasant odor and freshens the breath. Every dentist suggests brushing twice a day for good oral health. Since toothpaste is essential for keeping the oral cavity very hygienic. In herbal toothpaste, various herbs are used and the role of the herbs is to reduce dental plaque, and calculus, freshening the breath. A typical herbal toothpaste should not cause any irritation or pungent feeling during the brushing. Along with herbs some typical toothpaste ingredients also have been essential and those categories are antibacterial agents, fluoride, desensitizing agents, abrasives, and teeth whiteners. Initially, the multiple herbal extracts were well defined for their individual therapeutic uses and selected on the respective categories. In the present study Neem, Clove, Peppermint, Betel, and Turmeric were selected for the development of multi herbal toothpaste formulation. Along with these herbs, some of the excipients like calcium carbonate, tragacanth gum, sodium chloride, glycerine, sodium lauryl sulfate, sorbitol,propylparaben, carboxymethyl cellulose, and distilled water are been used.[4-7]

Herbal toothpaste[8]

Tooth Anatomy: Mouth anatomy is formed early in embryonic development. Besides being

necessary for communication and as a container for food, the mouth also plays an important role in digestion. Oral cavity consisting of hard and soft palates. The mucous membranes or tissue lining the upper and lower parts of the mouth and the tissue lining the cheeks. Gums or gums surrounding the tooth. The tongue, uvula, tonsils, and salivary ostium are all part of the normal anatomy of the mouth.

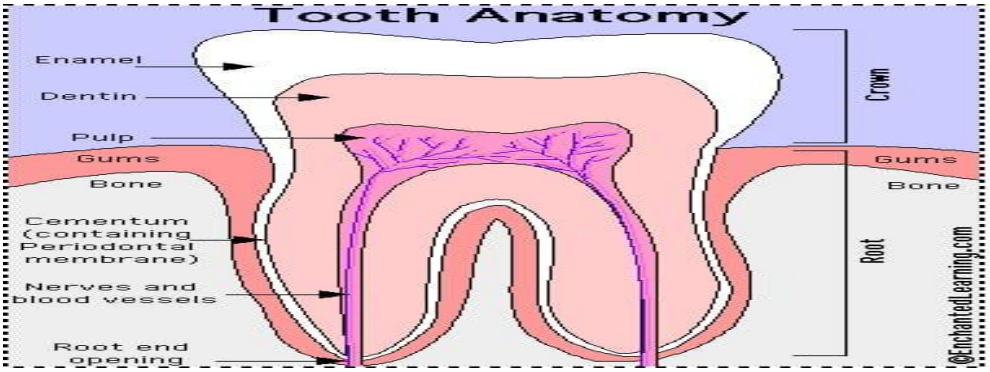

Fig. anatomy of tooth.

MATERIALS AND METHODS

Chemicals and reagents

The excipients calcium carbonate, **glycerin,** and sodium lauryl sulfate are **obtained** from LobaChemie (Mumbai). Tragacanth gum **and** sodium chloride **are** purchased from SD **Fine Chemical** Ltd **(Mumbai).** Sorbitol, propylparaben, and **carboxymethylcellulose** are purchased from Hi-Media **Laboratories** (Mumbai). All chemicals used are analytical grade.

Herbal Extracts

The herbs used in present formulations and their typical role in toothpaste were depicted in Table.[9-12] fig 1-3 represents the herbs used in the development of multi herbal toothpaste formulations.

Table 1: Herb Used In Toothpaste Formulation.

Herbs	Scientific name	Effect
Neem	Azadirachta indica	Anti-inflammatory, Antibacterial, Anti-hemorrhagic effects.
Peppermint	Mentha piperita.	Antiviral, Antispasmodiceffects
Turmeric	Curcuma Longa Linn.	Antioxidant, Antimutagenic,Antimicrobial, Antibacterial,Antifungal Effects

NEEM: *Azadirachta indica* tree belongs to the mead family.

Chemical Components

Neem is composed of Genin, Sodium Nimbate, Sarannin, Nimbin, Azadirachtin, Nimbidiol, Quercetin, and Nimbidin. Neem leaves contain dietary fiber, carbohydrates, at least 10 amino acids protein, calcium, carotenoids and fluoride.[8]

Fig- No-1: The Leafs of Neem.

Peppermint

Peppermint or Mentha piperita is a hybrid mint that is a cross between watermint and spearmint, belonging to the mint family.

Chemical Composition: Peppermint leaves produce approximately 0.1-1.0% volatile oils, mainly composed of menthol (29-48%) and menthone (20-31%).

Fig- No-2: Fresh Leaf Of Peppermint.

Turmeric

Curcuma longa Linn or Turmeric, also known as Haridra, belongs to the Zingiberaceae family.

Chemical Composition: Turmeric contains essential oils (6%) is composed of numerous monoterpenes and sesquiterpenes, including zingiberene, curcumin, α- and β-turmerone. but not limited to: The color base (5%) is curcuminoids, of which 50-60% is a mixture of curcumin, mono des methoxy curcumin and bis des methoxy curcumin.

Fig No 3: Dried Turmeric Powder.

Collection of Herb

- Neem leaves are collected from B.V.V.S Campus and dried in a forced air oven at 40 °C for days**.** The dried leaves are then collected and ground using a mortar and pestle until a fine powder is obtained.
- peppermint are purchased from grocery store and washed properly. Herbs are then dried and ground with a mortar and pestle until a fine powder is obtained.
- Buy pure, fresh turmeric powder at grocery store. All powdered herbs are then stored until further use.[13]

Method of preparation of toothpaste:-Trituration Method

All herbal extracts (powder) were collected and was used to make a multi-herbal toothpaste. A digital scale (FB 600 Essae, Teroka) was used to weigh the exact component amounts. Next, weighed neem, clove, turmeric, peppermint and betel herb powders were added to the mortarin ascending order of proportions. Then use a pestle to scrape the properly. Then add

Sodium Lauryl Sulfate, Calcium Carbonate, Sorbitol and mix well. Add glycerin, tragacanth gum and carboxymethylcellulose and mix well. Finally, sodium chloride and propylparaben are addedto the above mixture. This powder mixture is then converted to a pasty consistency by adding deionized water and rubbed until a viscous paste is formed.[14]

The component amounts were listed in Table 2.

Excipients	Quantity (g)		
	F1	F2	F3
Neem extract	1	1.5	1
Peppermint	1.5	1	1
Turmeric	1	1	1
Calcium carbonate	12.5	12.5	12.5
Glycerine	2.5	2.5	2.5
Sodium lauryl sulfate	0.5	0.5	0.5
Tragacanth gum	0.25	0.25	0.25
Sodium chloride	0.25	0.25	0.25
Sorbitol	0.25	0.25	0.25
Propylparaben	0.5	0.5	0.5
Carboxy methylcellulose	0.25	0.25	0.25
Distilled water (ml)	10-20	10-20	10-20

Evaluation of herbal toothpaste:-**Physical examination**

Developed multi-herbal toothpaste formulations were tested for organoleptic parameters suchas color, taste and odor, and the results were reported.[15]

PH determination

The pH of the formulation was determined by pH paper. 1 g of prepared herbal toothpaste was diluted with 100 ml of distilled water and 1 drop of diluted paste was poured onto pH paper, resulting in a color change compared to standard color strips. The pH of the formulation isthen recorded as.[16]

Viscosity

The viscosities of all toothpaste formulations were determined using a Brookfield viscometer (LVDVE Brookfield Engineering Labs, USA) and are shown in FIG. First, he stored a prepared toothpaste formulation, into which he dipped the spindle of a Brookfield fine mouth viscometer and in the he left for two minutes. The viscosity of all prepared multi-herbal toothpastes was measured using a Brookfield viscometer using a #64 spindle and the at 100 rpm. Three dial readings were taken to obtain the average viscosity of the formulation and the results were reported.[17]

Extrudability

The prepared multi herbal toothpaste formulations were taken and 5 g of each formulation wasaccurately weighed and filled in capped aluminum collapsible tubes and the open end of the aluminum tube was sealed with clinching apparatus. The initial weight is noted. The formulation of filled aluminum tubes was screened for application of gentle pressure and extruded paste is again weighed. Using the formula, the percentage Extrudability is been calculated and the results were compared with standard values.[18,19]

$E = [(W2/W1)] \times 100$ (1)

Where, E = % Extrudability, W1 = weight of gel taken (g), W2 = weight of gel extruded out from tubes (g). Percentage Extrudability was compared with these standards and how best the formulation can be extruded out is been reported. ≥ 90 % considered as Excellent, ≥ 80 % considered as good, ≥70 % considered as Fair.

Determination of Spreadability

The excess toothpaste was scrapped off from the edges, the top slide was subjected to a pull of 50 g with help of string attached to a hook, and the time (s) required by the top slide to cover adistance of 6.5 cm is been noted. The spreadability of each formulation was calculated using the below formula.[20,21]

$S = (m \times L)/t$ (2)

Where S is Spreadability (g.cm/s), m is the load applied (g), L is the length traveled by slide (cm), and t is (s)

Foamability

The foaming power of the herbal toothpaste was measured by placing 2 g of toothpaste and 5 ml of water into a graduated cylinder, recording the initial volume, and shaking the 10 times. The final volume of toothpaste containing foam in the graduated cylinder was recorded and the process was repeated three times to obtain an average value of.[22]

Determination of Abrasiveness

The abrasiveness of a toothpaste formulation is greatly affected by the abrasive agents used. Usually, calcium carbonate, as well as tricalcium phosphate and dicalcium phosphates, are well-known abrasive agents used in toothpaste formulations. The content is scratched over 15 to 20 cm long to check the presence of any abrasive particles present in the formulations. The

results were noted for all the formulations.[23]

Homogeneity

Toothpaste shall extrude a homogeneous mass from the transparent collapsible tube by applying of normal force at 27± 2°C. In addition, bulk contents shall extrude from the crimpof the container and then roll it gradually. The observation was reported.[24]

Organoleptic evaluations of Toothpaste formulations.

S.NO	Evaluation parameter	Observation
1	Colour	Mud green
2	Odour	Pleasant
3	Taste	Sweet
4	Smoothness	Smooth

CONCLUSION

Multi herbal toothpaste containing Neem, peppermint, clove, turmeric, and betel was prepared using the trituration method. The 3 formulations coded with F1, F2, and F3 were prepared and compared with commercially marketed products. All three formulations showed good viscosity, Spreadability, foamability, extrudability, homogeneity, and abrasiveness properties. All these three formulations showed good evaluation results when compared with marketed products thoseare Meswak, Patanjali, and Babool. So, from the above studies, it can be concluded that multiple herbs can be successfully incorporated into toothpaste formulation in order to get better and moreconvenient oral hygiene.

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