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Formulation and Evaluation of Herbal Toothpaste

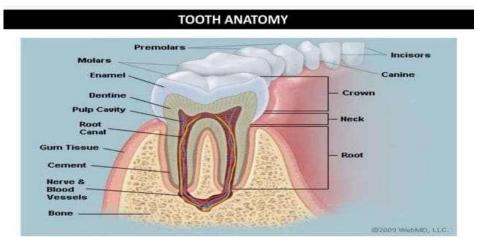
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Abstract: This study focuses on the formulation and evaluation of a herbal toothpaste, designed to offer an alternative to conventional chemical-based dental care products. The toothpaste was formulated using natural ingredients known for their antimicrobial, anti-inflammatory, and oral health-promoting properties, such as neem, clove, and tea tree oil. Various parameters, including pH, abrasive properties, and microbial efficacy, were assessed to ensure safety and effectiveness. The formulation was tested for its ability to reduce plaque formation, fight bacteria, and promote gum health. Results indicated that the herbal toothpaste exhibited comparable or superior performance in terms of antimicrobial activity and oral hygiene benefits, while being gentle on tooth enamel. The findings suggest that this herbal toothpaste could serve as a viable, eco-friendly alternative to traditional products in oral care.

Keywords: herbal toothpaste

I. INTRODUCTION



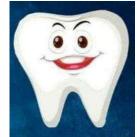
The tooth consists of two parts, crown and the root.

The crown of the tooth is covered by outer surface called enamel and it is the hardest tissue in the tooth.

The major composition of enamel is hydroxylapatite other than that it consists of water and keratin.

Dentine is the beneath part of the enamel, which is a composite of hydroxylapatite. It also consists of 70% of the collagen water.

Fluorine is the major component of dentine.



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A toothpaste or dentifrice is a substance used with a toothbrush for the purpose of cleaning the accessible the teeth. Purposes:

- a) Cleaning the teeth.
- b) Polishing the teeth.
- c) Removal of stains from teeth.
- d) Reduce incidence of tooth decay.
- e) Reduction of oral malodors.

Requirements of a toothpaste:

• When used properly, with an efficient toothbrush, toothpaste should clean the teeth adequately, that is, remove food debris, plaque and stains.

- It should leave the mouth with a fresh, clean sensation.
- Its cost should be such as to encourage regular and frequent use by all.
- It should be harmless, pleasant and convenient to use.

Types of toothpaste:

es of toothpuste.					
1. Anti-Cari	es/Sodium fluoride and sodiu	umContain fluoride to st	opEg. Colgate cavity protection		
Cavity Protecti	onmonofluorophosp ha	ate.tooth enan	nel		
toothpastes	(Antibacterial agent)	decalcification and prote	decalcification and protect		
		teeth from tooth decay and			
		cavities.			
2. Plaque &	Sodium Lauryl Sulphate,	Contain antibacterial	Eg. Crest-pro-		
Gingivitis	(Surfactant) Triclosane,	agent prevent the	health clinical gum		
Prevention	Zinc(Antibacterial) and	formation of dental protection			
toothpastes	Stannous	plaque.	plaque.		
	ions(Antimicrobial)				
3. Tooth	Papain (Antibacterial),	Have either higher	Eg. Colgate Optical		
Whitening	Dimethicone (thickening	abrasion value than	White and Colgate		
toothpastes	agent)	normal toothpastes to	Pro-clinical White.		
		mechanically remove			
		food, smoking and			
		other stains from			
		teeth.			
4. Sensitivity	Potassium nitrate,	Contain de-	Eg. Colgate		
toothpastes	strontium chloride,	sensitising agents to	sensitive,		
	potassium citrate	relief those with	Sensodyne		
	(Desensitizing)	tooth sensitivity by			
		closing the dentinal			
		tubules.			
5. Tartar Control	Pyrophosphates	Reduce new tartar	Eg. Colgate tartar		
toothpastes		build-up (but they	protection with		
		can't remove the	whitening		
		existing tartar).			
6. Fresh Breath	Peppermint, spearmint,	Enhance flavoring	Eg.		
toothpastes	menthol	agents along with	Colgate Max- fresh		
		antibacterials to fight			
		halitosis.			

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Ingredients

1) Cleaning and polishing agents:

The main purpose of the cleaning and polishing agent is to remove any adherent layer on the teeth.

Calcium carbonate:

Calcium carbonate is probably one of the most commonly used dental cream abrasives. Precipitated calcium carbonate (chalk) is available with a white or off-white colour and both particle size and crystalline form can be varied, depending upon its conditions of manufacture.

Sodium bicarbonate:

It is a very mild abrasive, usually used at a 5-30% level, in combination with other abrasives such as silica or calcium carbonate to achieve the required cleaning action.

2) Surfactants:

Surfactants are used in the toothpaste to aid in the penetration of the surface film on the tooth by lowering the surface tension. They also provide the secondary benefits of providing foam to suspend and remove the debris, and the subjective perception of toothpaste performance.

Sodium lauryl sulphate:

Sodium lauryl sulphate is currently the most widely used detergent in toothpaste because it satisfies almost all the requirements. It is a foaming & solubilizing agent that is derived from coconut and palm oil. SLS emulsifies fats, has a high affinity for protiens, and has mild antibacterial activity.

3) Humectants:

Humectants are used to prevent the paste from drying out and at the same time they give shine and some plasticity to the paste. Generally only two major humectants are considered for use in toothpaste.

Glycerin:

Glycerin is still the humectant used in greatest bulk quantity in toothpaste. It is one of the best humectants, producing a shiny, glossy product. It is stable, non-toxic, available from both synthetic and natural sources, and provides a useful sweetening function to the paste.

Sorbitol:

Sorbitol syrup is also extensively used throughout the industry and is sometimes considered superior to glycerin depending upon the formulation. It also imparts sweetness, and is a stable humectant.

4) Sweetening agents:

These are important for product acceptance, since the final product must be neither too sweet nor too bitter. These ingredients must always be considered in partnership with the flavour because of their combined impact. Sodium saccharin:

This is the sweetening agent in widest commercial use, and is generally used at a level between 0.05% and 0.5% by weight.

5) Flavours:

Flavours are probably the most crucial part of toothpaste because of consumer preferences. They are also the most proprietary part of the formulation. Exotic flavours, although available, are generally not well liked under longterm usage conditions, since one of the primary consumer requirements of toothpaste is the perception of freshness and cleanliness after brushing conventionally, therefore, mint flavours tend to predominate.

6) Minor ingredients:

This section is intended to cover all additional ingredients added to the paste to form either a functional or cosmetic aspect.

Titanium Dioxide:

Titanium dioxide may be added to give additional whiteness and brilliance to the paste.

7) Colours:

Colours can be an integral part of the aspect of any toothpaste that may influence consumer preference and purchase intent. A small amount of colour may be added to the paste as a whole to give it a pastel share. For all y if a translucent gel had been formulated then colour would be added to give it a different visual appearance.

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8) pH regulators:

Occasionally buffering systems need to be added to the dental cream to adjust the pH of the final finished product.

Formulation of Toothpaste:

Ingredients	Formula % (by weight)	Examples
Surfactant	1.0-2.0	Sodium lauryl sulphate
Humectant	10-30	Glycerin, Sorbitol
Gelling Agent	0.5-1.5	Hydroxy ethyl cellulose, carboxy methyl cellulose
Sweetener	0.05-0.5	Sodium Saccharin
Flavour	1.0-3.0	Spearmint, Menthol
Colour	<1.0	Titanium Dioxide
water	to 100	

Procedure for preparati

a) Take half the quantity of water, add tragacanth powder & heat it in a water bath to get a gel.

b) To the remaining quantity of water, add glycerine, sodium lauryl sulphate, preservative & mix it thoroughly to get a clear solution.

c) Weigh the required quantity of saccharin and calcium carbonate solution & mix it with the help of mortar and pestle.

d) To this powder, add gum tragacanth & mix well.

e) Add glycerine, preservative & sodium lauryl mixture to it and triturate uniformly to get a paste.

Finally add flavouring agent & triturate well.

g) Transfer to a narrow mouthed plastic tube, seal & label.

Different toothpaste formulation

FORMULA:-

Sorbitol (70%)	-	54.1%w/w		
Silica (Abrasive)	-	18%w/w		
Xylitol	-	10%w/w		
Silica (Thickener)	-	5.5%w/w 3%w/w		
Polyethylene glycol 600	-	3%w/w		
Sodium lauryl sulphate	-	1.2%w/w		
Flavour	-	0.9%w/w		
Fetrasodium pyrophosphate	-	0.5%w/w		
Titanium dioxide	-	0.5%w/w		
Sodium benzoate	-	0.5%w/w		
Carboxymethyl cellulose	-	0.35%w/w		
Sodium fluoride	-	0.243%w/w		
Sodium saccharin	-	0.2%w/w		
Colourwater	-	100%w/w		
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2) Toothpaste offering whitening: Formula :-

Glycerin	-	25%w/w
Silica abrasive	-	20%w/w
Propylene glycol	-	17.6%w/w
Sodium bicarbonate	-	12%w/w
Water	-	6%w/w
Propylene glycol 600	-	3%w/w
Sodium carbonate	-	2%w/w
Silica thickener	-	2%w/w
Sodium lauryl sulphate	-	1.7%w/w
Colour -	-	100%w/w

3) Toothpaste for sensitivity FORMULA

POTASSIUM NITRATE - 10%W/W

- 25%W/W GLYCERIN

Polyoxyethylenesorbitan monolaurate - 2%W/W

SILICA -24%W/W

FLAVOUR -1%W/W

SODIUM SACCHARIN 0.2%W/W -

> WATER 100%W/W



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REFERENCES

- [1]. https://chemistscorner.com/cosmetic-formulation- basics-toothpaste/ Access on 04.03.2019.
- [2]. https://jada.ada.org/article/S0002-8177(14)63665- 5/abstract Access on 04.03.2019.
- [3]. https://www.ncbi.nlm.nih.gov/pubmed/15628997 Access on 04.03.2019.
- [4]. https://www.happi.com/contents/viewformulary/20 05-02-01/toothpaste- formula Access on 04.03.2019.
- [5]. https://www.deltadentalins.com/oral health/whats- in-your-toothpaste.html Access on 04.03.2019.
- [6]. http://www.evansondds.com/a-guide-to- understanding-toothpaste- ingredients/ Access on 04.03.2019.

