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Herbal Toothpaste Preparation, Evaluation, and Comparison with Commercially Available Tooth Pastes

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ABSTRACT:
The primary goal of this study is to manufacture, test, and compare Lab Made Herbal toothpaste to commercially available herbal toothpastes. Commercial herbal toothpastes such as Colgate, Dabur Red, and Dantakanti were tested for quality in this study. All marketed herbal tooth pastes and lab-made herbal toothpastes were examined and found to meet the Bureau of Indian Guidelines' standards. pH, spreadability, abrasiveness, foaming ability, fineness, and stability studies were all used to evaluate the formulations. All of the studies demonstrated that Labmade formulations are comparable to marketed formulations and are rarely better in terms of performance. As a result, the Labmade formulation chosen was verified to be of high quality.

Keywords: - lab made herbal product, Toothpaste, Bureau of Indian Guidelines standards.

I. INTRODUCTION

[1] Oral hygiene is an essential key to keep proper appearance, influence of a person and gives confidence. The teeth include two parts, one is crown and another is root. The crown of the enamel is included through outer floor referred to as tooth and it is the toughest tissue withinside the enamel. The essential composition of teeth is hydroxyl apatite apart from that it includes water and keratin.

[2] Dentine is the underneath a part of the tooth, that's a composite of hydroxyl apatite. It additionally includes 70% of the collagen water. Fluorine is the crucial issue of dentine. Oral includes now no longer handiest enamel however additionally saliva for clean to swallow the meals. Saliva is the essential element which supposed for lubricating the meals and to hold right surroundings withinside the mouth. Saliva is produced throughnumerous glands together with Labial, lingual, buccal and palatal are the bigger and smaller glands which produce saliva constantly to hold the enamel surroundings withinside the dynamic state.

[3] Proteins, enzymes, microorganism and mucopolysaccharide are gift withinside the saliva and the inorganic substances like calcium, sodium, potassium, chloride, phosphate ions. Toothpaste has been used because the historic past and is one of the primary irreplaceableadditives of oral fitness care.

[4] The layout of toothpaste formulations started in China andIndia, as 300-500 BC. During that period, squashed bone, pulverized egg and clam shellshad been applied as an abrasive in the context of tooth cleaning.Modern toothpaste formulations had been advanced by the 19th century. Later on, chalk and cleaning soap have been included to thoseformulations. After 1945, numerous method improvements of various detergents hadbegun, sodium lauryl sulphate have been used as an emulsifying agent. In latest years, theconsciousness has shifted closer to the discharge of energetic elements for the duration of method developmentsto save you and /or deal with oral illness.Toothpaste is a dentifrice used to clean, keep and enhance the fitness of teeth. Toothpasteis particularly used to sell oral cleanliness and additionally acts as an abrasive that allows to save youthe dental plaque and meals debris from the teeth, aids withinside the putting off and/or veiling ofhalitosis, and releases energetic elements consisting of fluoride to resource in stopping teeth and gumdisease (eg. Gingivitis). The majority of the cleansing is accomplished via way of means of the mechanicalusage of the toothbrush with the assist of excipients utilized in toothpaste. Thepolyherbal and natural formulations are very powerful as they comprise energetic chemicalelements consisting of polyphenols, gums,

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alkaloids, glycosides etc. These formulations haveadditionally been tested to have one of a kind organic activity. This opens a brand-new door forformulating and comparing new formulations of natural toothpaste. The primary intention of thisresearch is to assess the Herbal toothpaste formulations and evaluating with threefamous industrial toothpaste.

II. MATERIALS AND STRATEGIES

Materials: -

[5]The weight of each component became determined through reviewing previous natural toothpaste formulations. The mixture of weight of all of the components will formulate 40gm of toothpaste. The elements of the toothpaste organized in lab are given in table 1 and in comparison, with marketed natural enamel pastes Colgate, Dabour Red, and Dantakanti.

Herbal tooth paste was organized the usage of guava leaves extract, Neem stem and bark, babul leaves, kalmi bark, Honey, acacia, calcium carbonate and sodium lauryl sulphate, sodium chloride, camphor, Para hydroxy benzoic acid. Guava extract offers comfort from toothache, Neem stem and bark has antibacterial activity, Babul leaves has Anti-inflammatory effect and kalmi bark act as flavouring agent. Acacia to prevent gingivitis and additionally acts as gelling agent. Sodium lauryl sulphate is used as a foaming agent. Sodium chloride is used as prevent cavities. Para hydroxy benzoic acid acts antimicrobial agent. Camphor act as antiseptic agent. calcium carbonate act as whitening agent and non-abrasive agent.

TABLE 1: -HERBAL TOOTHPASTE FORMULATION

Sr. No.	Ingredients		Quantity Given	Uses
1	Honey	-	2gm	Sweetening agent
2	Calcium Carbonate	-	14gm	Non-abrasive whitening agent
3	Acacia	-	2gm	Prevention and treatments of gingivitis
4	Glycerine	-	8gm	Humectant
5	Sodium chloride	-	0.8gm	Prevent cavities
6	Camphor	-	2gm	Antiseptic agent
7	Sodium lauryl sulfate	-	2gm	Detergent & foaming agent
8	Para hydroxybenzoic acid	-	1.2gm	Preservative
9	Neem stem & bark (Azadirachta Indica)		2g	Anti-bacterial

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10	Babul leaves (Vachellia nilotica)		2g	Anti-inflammatory
11	Guava leaves (Psidium guajava)		2g	Antiseptic
12	Kalmi bark (Water spinach-lpomoea aquatica)		2g	Flavouring agent
13	Distilled water		q. s.	Vehicle

Method of preparation: -

[6] All herbal element were dried and powdered using home mixer. The required quantity of substances had been weighed and put in mortar. Calcium carbonate, Sodium lauryl sulphate, honey and glycerine were mixed in water. Acacia was put into the above mixture. This solution was combined drop wise into mortar containing natural substances and triturated nicely till a paste consistency is formed**.**

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Evaluation OfHerbalToothpaste: -

[7],[8] As point out by the rules, the instruction or direction were recommended for every measurement slot of Type-I (non- fluorinated) OR Type-II (Fluorinated) toothpastes.

Actual Assessment (Variety, scent, taste, perfection, relative thickness)

Figured out toothpaste was assessed for its tone. The visually colour become checked.

Odour become discovered through smelling the product.

Taste become checked manually through tasting the formula.

The Smoothness become examined through rubbing the paste formula among the fingers.

pH

Weighed 10 g of toothpaste positioned in a 150 ml beaker. Added 10 ml of boiled after which cooled water. Stirred vigorously to make a suspension. Measured the pH of the suspension the use of pH meter.

Homogeneity

The toothpaste shall extrude a homogenous mass from the collapsible tube or any appropriate box via way of means of applying of regular pressure at 27±20^{0}C. in addition bulk of contents shall extrude from the crimp of box and then rolled it gradually.

Assurance of sharp and edge rough particles

Extrude the content 10-12 cm cm long at the butter paper, repeat the identical technique for at the least ten collapsible tubes. Press with the contents of the entire period with finger tip for the presence of sharp and tough edged abrasive particles. Toothpaste shall not incorporate such particles.

Foamability

The foamability of formulated toothpaste estimate through taking small quantity of formula with water in measuring cylinder initial quantity was recorded and then shaken for 5 times. Final quantity of foam was recorded.

Determination of fineness: -

Weighed correctly approximately 10g of toothpaste and positioned in a 100 ml beaker. Added 50 ml of water, and allowed to stand for 30 min with stirring till the paste is absolutely dispersed. Transferred the product solution to 150µ & 75µ IS sieves and washed with a gradual flow of water. Allowed the going for walks tap water to empty of absolutely and dried the sieve at 105±2 ℃ through putting it in an oven. Transferred the residue particle present at the sieve directly to a watch glass and weighed it

Material on the sieve % by (Retained mass / Material taken) x 100.

Conformation Of Moistness and Unsteady

5 g of formulation put in a porcelain dish containing 6-8 cm in diameter and 2-4 cm depth in it.Dry the sample in an oven at 105^{0}C.

Calculation

% by mass = 100M1/M2

Where, M1-Loss of mass(g) on drying

M2- Mass (g) of the sample taken for the test.

Extrudability

In this method, the formulated paste was filled in standard covered folding aluminium tube and fixed by creasing as far as possible. The worth of tubes were recorded. The cylinders were put between two glass slides and were clipped. 500g was put over the slides and afterward cap was taken out. How much the ousted stick was assembled and measured. The percent of the expelled paste was determined.

Spread ability

In this procedure slip and drag characteristic of paste incorporate. The formulated paste put like sandwich between this slide and another glass slides for 5min to remove air and to give a uniform film of the paste between slides. Overabundance of the paste was rejected off from the edges. The top plate was then exposed to pull of 80g with the help of string appended to the snare and time (sec) expected by the top slide to cover a distance of 7.5cm was noted. A short entomb vak demonstrated better spreadability.

Formula was utilized to ascertain spreadability-

S=M× L /T

Where, S= Spread ability

M= Weight withinside the skillet (appended to the higher slide)

L= Length moved through the glass slide

T=Time (sec) taken to part the higher slide from the floor slide.

Stability observes

The balance observes changed into accomplished as consistent with ICH guideline. The figured-out paste fill into packed in folding cylinder and saved at select temperature, moistness conditions, 25ºC± 2ºC/60% ± 5% RH, 30º C ± 2ºC / 65% ± 5% RH, 40ºC ± 2ºC / 75% ±5% RH during 3 months and studied for expression, pH and expansion.

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Bacterial activity

[9] In-vitro adversary of bacterial study, sorted out stick happened related by the circle scatteringtechnique in triplicate manner with the use of Mukker Hinton Agar median in against the pathogenic bacterial strain Staphylococcus aureus [S. aureus]. The S. aureus became to begin with cultured cells have been have a tendency to more than one in the Muller Hington agar plates. Then the formulated paste containing discs have been placed over the bacterial plates and incubated at 37ºC for the 24 hours, evaluating ciprofloxacin because the positive control. The diameter of the ZOI became measured in millimetres (mm). The (MIC) Minimum inhibitory concentration are the smallest centralization where the compound introductions no seen of microbial growth. It had been decided through agar streak dilution technique in triplicate way. The protocol includes method of microbial suspension (~105 CFU/mL), application to the Petridis with serial dilution and incubation of Petridis at 37±1ºC.The MIC value became determined and average was taken.

Record of plate and interpretation

[9] After 15 to 16 hours of incubation, every plate was examined. If the plate fine streaked, the inoculums had been accurate the end result of ZOI should beuniformly round and a confluent lawn of growth. After measure the diameter of ZOI the records were mentioned and decoding the end result.

III. RESULTS AND CONVERSATION: -

[10] Evaluation tests had been finished to view the exclusive properties of Lab made and industrial toothpastes. All the results of comparing parameters had been given in table 2.

In the existing study, relatively identical and infrequently higher outcomes had been found with Lab made method than marketed formulations. Both preparations have proven identical efficacy in terms of foaming ability. But improved activity in terms of abrasiveness and spreadability turned into seemed in Lab made method (fig.1). Comparison of the abrasiveness of advertising and marketing pastes with Lab made method shows that Lab made method has greater abrasiveness than advertised pastes.

All the toothpastes had been having suitable consistency and smooth texture. Also proven no signs and symptoms for deterioration including segment separation, gassing, fermentation while all of the samples had been positioned at a temperature of 45±2ºC for a duration of 28 days. It showed that the toothpaste is stable. The best amount of residue has retained on sieve for Lab made approach this is better than the residues from commercially available toothpaste. So, it became determined that Lab made preparation has proven reasonably proper % of foamability (fig.2).

The moisture and unstable matter found in Colgate substantially greater than the rest of the formulations. The percentage of moisture and unstable content material in Lab made method has the equal percentage of moisture as that of Dauber red and Dantkanti. These outcomes provide an explanation for that moisture and unstable content material are in the limits (Fig.3). The colour produced with hydrogen sulphide in check answer is much less than received with general solution indicating that amount of lead is with withinside the acceptance criteria. The Lab made formulations is much less than the standard values noted in table2.

Table 2: -Evaluation tests for Lab made and commercial Herbal toothpastes

Sl.no	Properties	Lab made	Colgate	Dubar red	Dantkanti
1	Hard and sharp edged abrasive particles	Absent	Absent	Absent	Absent
2	Abrasiveness	4	2	2	3
3	Spread ability	5.8	5.3	5.1	4.5
4	pH	6.63	8.3	7.4	8.0
5	Stability (45±2C for128 days & at 5 C for 1 hour)	Good	Good	Good	Good

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6	**Fineness (%by mass)**	0.45	0.35	0.37	0.42
7	**Moisture and volatile matter (%by mass)**	1.7	2.2	1.7	1.9
8	**Foaming ability**	78	62	76	71

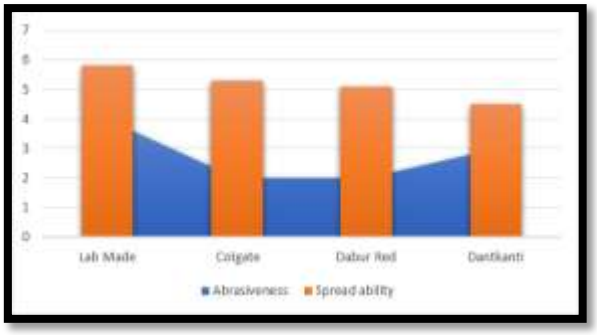

Fig.1. Abrasiveness and spread ability of Lab made and commercial tooth pastes

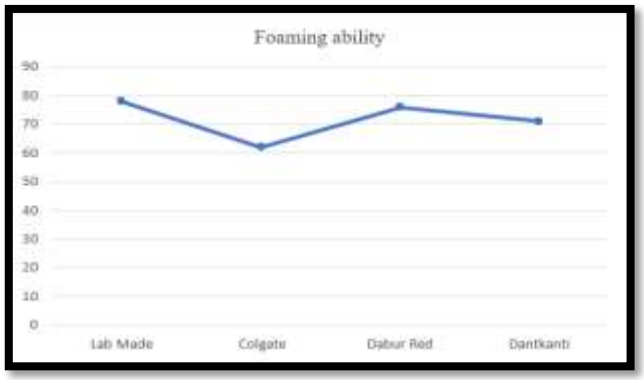

Fig.2. Foaming ability of Lab Made and commercial tooth paste

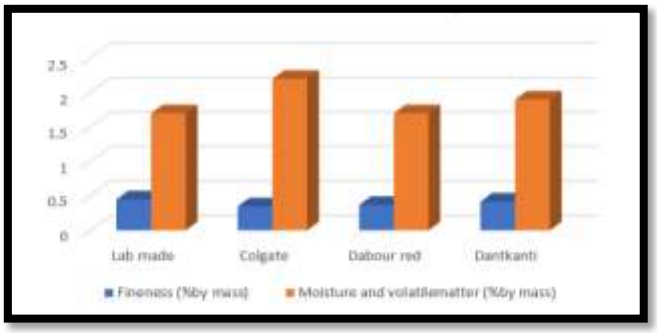

Fig.3. Fineness (%), Moisture and volatile matter (%) of Lab made and commercial tooth paste

IV. CONCLUSION: -

Herbal toothpastes have an emphasized function in keeping the oral hygienic nature in addition to stopping dental caries. Based in this pattern, Lab made Herbal toothpaste turned into formulated through choosing appropriate elements to get the formula greater stable. Evaluation and comparison of effects with commercial Herbal toothpaste, confirmed that Lab made toothpaste is having identical patronizing and engrossing passion over the marketed formulations (Colgate, Dauber red and Dantkanti).All the advertised Herbal tooth pastes and Lab made Herbal toothpaste are evaluated and in contrast with the necessities unique via Bureau of Indian necessities. This initial in vitro take a look at confirmed that Lab made

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Herbal toothpaste turned into similarly efficacious as three commercially famous toothpastes in terms of all assessment residences of toothpaste. Hence, through the proof of in vitro studies, its miles concluded that Lab made Herbal toothpaste formulated in a laboratory became discovered to be of proper quality and more secure with least side effect than synthetical preparation.

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