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Formulation and Evaluation of Herbal Mouth Paint Containing Aloe Vera and Clove Oil

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Sujit Ubale*[1], Mohammed Akif Shaikh[2], Smita[1], Amit Sharma[2], Shyamsundar Sharma[2], Pankaj Sharma[2]

[1] Asst. professor, Ideal college of pharmacy and research, Kalyan. India.

[2] Student, Ideal college of pharmacy and research, Kalyan. India.

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ABSTRACT

The fundamental point of the accompanying exploration is to form mouth paint which contains Aloe vera and clove oil as the principal constituent. In various clinical assessments, Aloe vera has been used in dentistry for wound-recovering effects, Gum infection, plaque control, and re-establishing oral mucosal wounds. Aloe vera is regular, antiquated fixings. The arranged Aloe vera gel And clove oil mouth paint surveyed by real evaluation: Colour – yellow, Appearance – Homogeneous, smooth nature, Transparency – Clear and Relative thickness 10, No Microbial advancement in model plate, pH-7.1, Viscosity – 1000cp, Spreadability – 15-18 cm/sec and observed extraordinary strength. The counter microbial Evaluation against Staphylococcus aureus uncover that planned aloe vera mouth paint showed extraordinary action with ZOI of 21.44mm at MIC of 26µg/mL. The outcome from this investigation inferred that the customary plant Aloe vera & clove oil mixture used to frame mouth paint may be one more method for managing sort out mouth paint fiscally And least optional impact than synthetic specifying and incredible expansion in future concerning dental assessment in typical cures.

INTRODUCTION:-

Periodontal illness is perceived as a significant general medical condition all through the world and happens in all gatherings, identities, races, sexes, and financial levels. It is portrayed by irritation and degeneration of the gums, supporting bone, periodontal tendon, and cementum, and gathering of bacterial microorganisms, for the most part inside the periodontal pockets. The periodontal infection normally alludes to provocative illnesses that are plaque instigated that is gum disease and periodontitis. [31.32] Gum disease is the moderate Stage of infection brought about by an amassing of supragingival plaque and portrayed by enlarging, light draining, and redness of the negligible gingival. Gum disease is related to an adjustment of the microflora, moving from a gram-positive anaerobic Flora to a more gram-negative one. Periodontitis, a more serious phase of periodontal sickness, brings about the resorption of the alveolar bone and separation of the periodontal tendon supporting tooth. Periodontitis is an incendiary reaction to the excess of anaerobic living beings, for example, Prohormone's gingivitis, Prevotella intermedia, Fusobacterium nucleatum, Campylobacter rectus, Prevotella Melaninogenica, and Actinobacillus actinomycetes Contains.[1,2] The traditional strategy for treatment the Periodontal infection like oral, skin, and foundational measurement structures have significant drawbacks like superinfection, low or rebelliousness, low gingival crevicular liquid degrees of anti-infection agents, fundamental incidental effects, brief length, and high relative expense. Periodontal treatment intends to fix excised tissue, decrease the number of pathogenic microbes and dispose of the unhealthy pockets. Ongoing advances in the field of dentistry have advanced the utilization of homegrown and regular Products for the treatment of different oral illnesses. There have been various reports of the utilization of herbal plants and regular items for the treatment of oral sicknesses.[3]

The most known type of Aloe vera which is developed overall is *Aloe barbadensis* Miller. Aloe vera gel is gotten from within aloe leaf. It is the adhesive gel created from the centre (parenchyma) of the plant leaf. The gel invigorates cell development and upgrades the rebuilding of harmed skin. [5.15]It saturates the skin since it has a water-holding limit. As utilize a beverage will safeguard the mucous film of the stomach, particularly when disturbed or harmed. Clove oil is one such item Exhibiting different advantages and has acquired Considerable significance in clinical examination. Since Clove oil shows low inborn harmfulness alongside a wide Spectrum of natural activities like pain-relieving, Antiseptic,

antispasmodic, hostile to neuralgic, carminative, Anti-irresistible, sanitizer, and other valuable properties, it is extremely helpful in dentistry likewise.

Different aftereffects or poisonousness of synthetic medications can be overwhelmed by utilization of homegrown medication as reasonable medication conveyance framework this is better quite viable with less incidental effect. The current review was meant to Formulate mouth paint containing Aloe vera and clove oil for the treatment of periodontal sicknesses and afterward assessed for their physicochemical properties including drug content, spreadability, expel capacity, in-vitro Antibacterial movement. [7,9]

MATERIAL AND METHOD

Chemical:- Carbapol-940, Sodium CMC, Sodium benzoate, PEG-400, Sod. Saccharin, Sod. Lauryl sulphate all these chemicals were taken from our college laboratory i.e., Ideal college of pharmacy and research. Clove oil and honey are purchased from a local shop in Kalyan.

Collection & Extraction:- The leaves of Aloe vera were gathered from the plant present at the nursery grounds of the Ideal college of pharmacy and research located in the Bhal area of Kalyan. The fresh Aloe vera leaves were collected from the plant, washed and rinsed with a chlorine solution, then dissected longitudinally and the Aloe gel was scraped out using a sterile spoon, minced, and homogenized in a mixer.

FORMULATION:-

Carbopol-940 and sodium CMC were dispersed in 40 ml of distilled water with continuous agitation. In another beaker, sodium benzoate was dissolved in 10 ml of water and heat it to dissolve properly. After cooling of solution polyethylene glycol 400 was added and mixed with the first solution. After this required quantity of aloe Vera and clove oil was mixed and the remaining chemicals were also mixed in the above solution properly with continuous

stirring and tri-ethanolamine was added dropwise to the formulation to obtain gel in required consistency and for pH adjustment.

During the formulation of the trial phase various problem occurs like viscosity, homogeneity, spreadability, etc. to overcome this problem concentration of carbapol-940 and sodium carboxymethyl cellulose were increased and decreased.

Sr No	Ingredients	Quantity taken		
		F1	F2	F3
1	Aloe vera	7g	8g	7.5g
2	Clove oil	2ml	1ml	1.5ml
3	Carbapol-940	3.5g	3.5g	3.5g
4	Honey	0.6g	0.6g	0.6g
5	Sodium CMC	1.5g	1.5g	1.5g
6	Sodium benzoate	0.5g	0.5g	0.5g
7	Sodium saccharin	0.7g	0.7g	0.7g
8	Peppermint oil	0.3ml	0.3ml	0.3ml
9	PEG-400	2g	2g	2g
10	Sodium lauryl sulphate	2g	2g	2g
11	Tri-ethanolamine	qs.	qs.	qs.
12	Distilled water	qs.	qs.	qs.

EVALUATION:-

1. Physical Appearance:-

- Colour:- A white background was used to assess the colour of the formulation.
- Consistency:- The consistency of the product was tested by putting it to the skin.
- Greasiness:-The application of the greasiness to the skin aided the greasiness.
- Odour:- The odour of the gels was determined by dissolving the gel in water and smelling it.[1]

2. Transparency:-

In a 10ml test tube, 5ml of prepared gel was placed and its transparency was tested visually.

3. Smoothness:-

By rubbing the gel formulation between the fingers, the smoothness of the formulation was determined, and it was determined whether the gel was smooth, clumped, homogeneous, or rough. [1,37]

4. Relative Density:-

Weight in gram taken in 10ml formulation and 10ml distilled water using RD bottle was used to determine the relative density of the formulation.

5. Determination Of pH:-

A pH meter was used to determine the pH of the prepared gel. 1 g gel was dispersed in 100 mL filtered water in this way. Before use, the electrode was cleaned with double distilled water, dried with tissue paper, and calibrated using a standard buffer solution at 7.0, 7.0, and 7.33. The pH readings were taken three times and the average results were determined. [29,33]

6. Determination Of Viscosity:-

The viscosities of the formed gels were determined using a Brooke field viscometer with spindle no. 7 and spindle speed of 100rpm at 25°C, with the matching dial reading on the viscometer documented.

7. Determination Of Spreadability:-

A modified wooden block and glass slide apparatus were used to test spreadability. A wooden block with a fixed glass slide and a pulley made up the equipment. A thread was used to connect a pan to another glass slide (movable). For the spreadability test, a measured amount of gel was placed in the fixed glass slide, and the movable glass slide with a pan attached was placed on top of the fixed glass slide for 5 minutes, sandwiching the gel between the two slides. The pan was now filled with around 30 grams of weight. The length of time it took for the slides to separate was recorded. The spreadability was calculated using the formula below.[37]

$$S = M \times L / T$$

Where,

S stands for Spreadability.

M denotes the amount of weight in the pan (tied to the upper slide)

L is the length of the glass slide that has moved.

T is the time it took to separate the upper and lower slides (in seconds).

8. Determination Of Extrudability:-

It was determined by measuring the amount of gel that extruded through the tip of a tube filled with gel and having a tip opening of 5mm when pressure was applied to the tube.[2]

9. Determination Of Homogeneity:-

After the gels had been set in the container, all of the produced gels were visually inspected for homogeneity. They were examined for the appearance of aggregates and the presence of any.

10. Stability Study:-

The stability test was carried out by ICH recommendations. The formulated gel was filled in collapsible tubes and stored at different temperature and humidity conditions, 25ºC± 2ºC / 60% ± 5% RH, 30º C ± 2ºC / 65% ± 5% RH, 40ºC ± 2ºC / 75% ±5% RH for three months and studied for appearance, pH and spreadability. [37]

11. Determination Of Drug Content:-

The drug content of the gel formulations was evaluated by dissolving 1 g of gel in 100 ml of solvent (a mixture of ethanol and phosphate buffer pH 6.8 for the clove oil and Aloe-vera gel combination formulation). For complete dissolution of the formulations, the solutions were shaken for 4 hours and then stored for 6 hours. The solutions were then filtered via 0.45 mm membrane filters, dilutions were prepared, and the solutions were spectrophotometrically analysed. The linear regression equation derived from the calibration data was used to compute the drug content.

12. Determination Of Antimicrobial Activity:-

The antibacterial activity of a combination of clove oil and Aloe-vera gel was tested using the agar cup plate method. All clove oil and Aloe-vera gel formulations of around 1% were deposited aseptically in cups of agar plate that had been previously inoculated with culture. Before incubation at 37°C for 24 hours, the plates were left at room temperature for 30 minutes. Azithromycin (Macrolides), a broad range antibiotic, was utilized as a positive control to achieve comparable data. After 24-48 hours of incubation, plates were examined for the presence of the zone of inhibition. The diameter of microbial growth inhibition zones (millimetres) was used to assess antimicrobial activity.[1,29,37]

RESULTS:-

1. Physiochemical characteristics of combination Formulation of clove oil and aloe vera gel.

Sr No	Parameter	Clove oil	Aloe vera	Formulation
1	colour	Pale yellow	Greenish-yellow	Yellow
2	odour	aromatic	odourless	Aromatic (odour from flavouring agent)
3	Solubility in ethanol	Freely soluble	soluble	soluble
4	density	1.02g/ml	1.2g/ml	1.12g/ml
5	Refractive index	1.492	1.335	1.418
6	Acid value	3.66	0.41	2.43

2. Transparency:-

The manufactured tooth gel was translucent and uniform in appearance.

3. Smoothness:-

The tooth gel that was created was silky smooth.

4. Relative density:-

The relative density of the developed tooth gel was 9.8.

5. Determination of pH:-

Sr No	Formulation	pH
1	F1	7.0
2	F2	7.0
3	F3	7.33

The mean pH of the prepared tooth gel was found to be 7.11.

6. Determination of viscosity:-

Sr No	Formulation	viscosity
1	F1	1000cp
2	F2	800cp
3	F3	840cp

7. Determination of Spreadability:-

Sr No	Formulation	Spreadability (gcm/sec)
1	F1	18.55
2	F2	15.69
3	F3	16.08

The gel's spreadability was determined to be between 15.69 and 18.55 gm-cm/sec, indicating that they may spread smoothly and uniformly.

8. Determination of extrudability:-

Sr No	Formulation	Extrudability %
1	F1	92.65
2	F2	89.56
3	F3	90.46

The gels formulation's extrudability was found to be in the range of 89.56 to 92.65 percent, indicating that the gels formulation was satisfactory.

9. Determination of homogeneity:-

Sr No	Formulation	Homogeneity
1	F1	Very good
2	F2	Good
3	F3	Very good

The gels formulation of homogeneity was found to be Very good.

10. Stability Study:-

At , 25ºC± 2ºC / 60% ± 5% RH,

colour	appearance	spreadability	pH
yellow	homogeneous	19.50	7.5

At 30º C ± 2ºC / 65% ± 5% RH,

colour	appearance	spreadability	pH
yellow	homogeneous	18.69	7.0

At 40ºC ± 2ºC / 75% ±5% RH

colour	appearance	spreadability	pH
yellow	homogenous	17.62	6.7

The formulated tooth gel showed good stability in the stability study.

11. Determination of drug content:-

Sr No	Formulation	Drug % content
1	F1	95.60
2	F2	90.40
3	F3	93.60

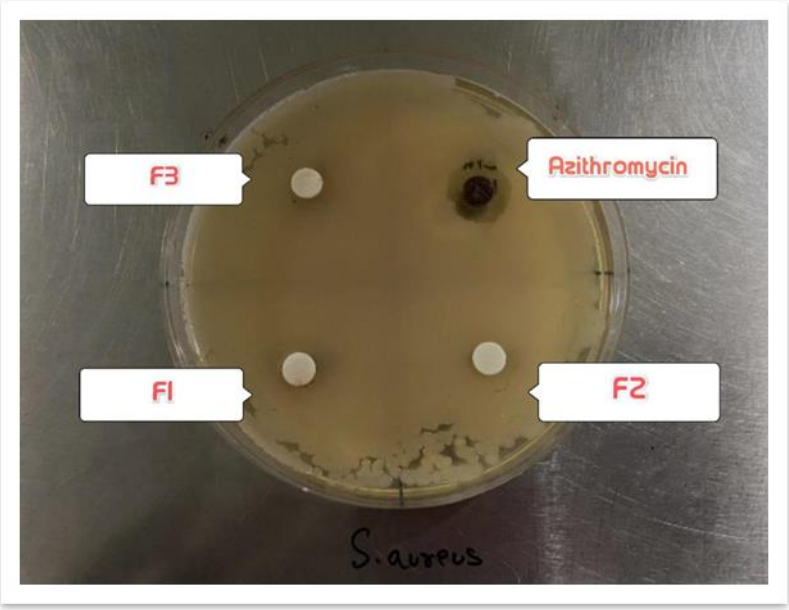
The formulations contained between 90.40 to 95.60 percent of the active ingredient. It was found that the medication did not degrade during the production process based on the values acquired from the drug content. The drug content of formulation F1 was determined to be the highest.

12. Anti-microbial activity:-

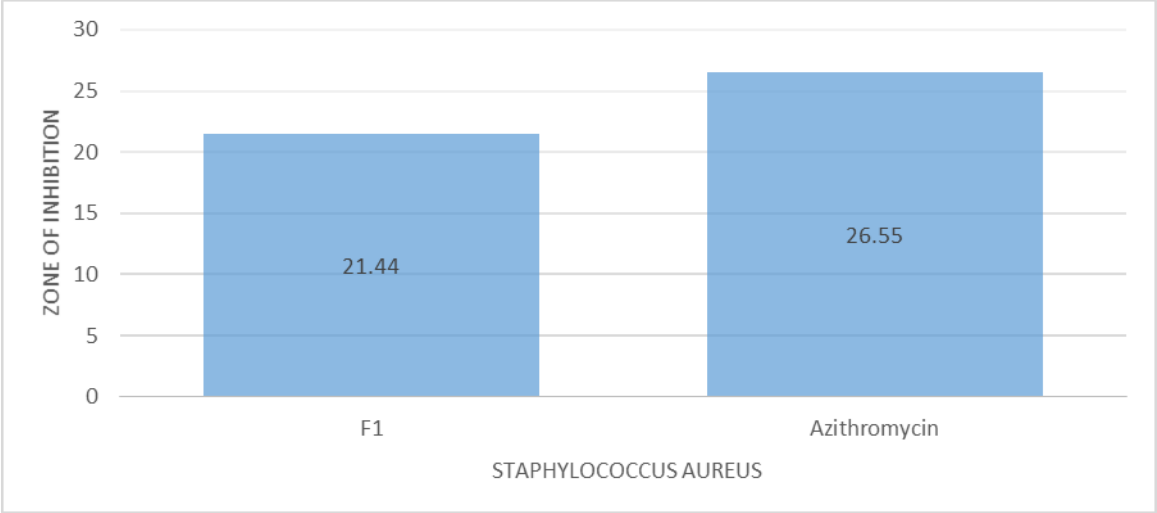
Sr No	Formulation	Microorganism	Zone of inhibition	Azithromycin
1	F1	Staphylococcus aureus	21.44mm	26.55mm
2	F2	Staphylococcus aureus	19.56mm	25.60mm
3	F3	Staphylococcus aureus	18.90mm	23.46mm

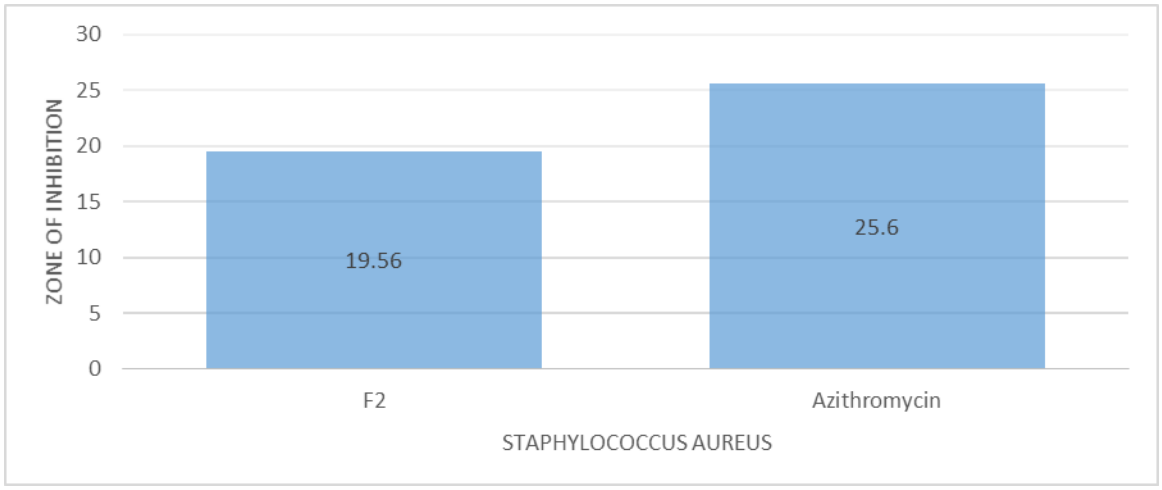
When compared to other formulations, the clove oil and aloe vera gel F1 combination gel formulations demonstrated good drug content. As a result, these formulations were chosen for antibacterial research. Antimicrobial investigations revealed that a combination gel

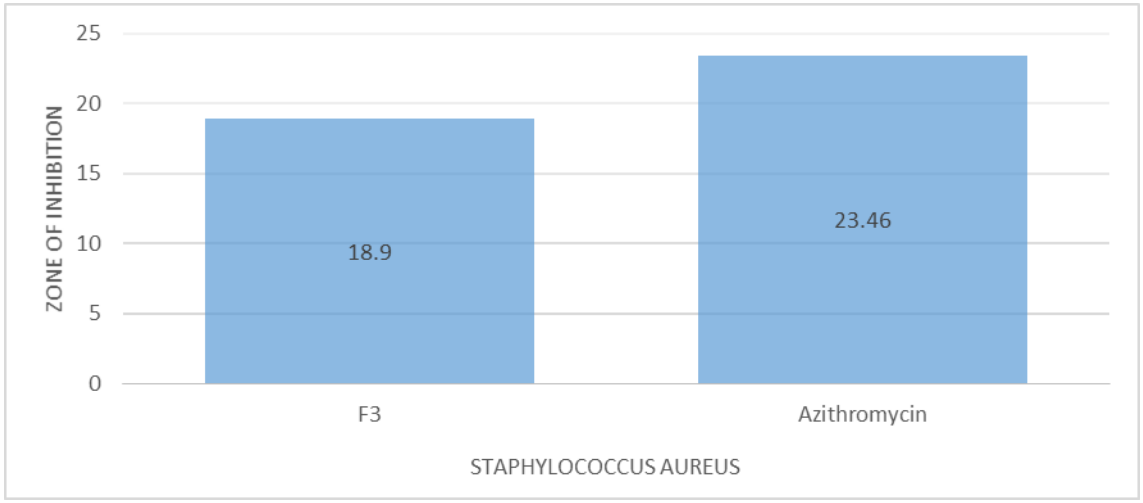
formulation of clove oil and aloe vera gel F1 inhibited staphylococcus aureus to the greatest extent.



ANTIBACTERIAL TEST







GRAPHS OF ANTI-MICROBIAL ACTIVITY

CONCLUSION:-

Natural medicines are more acceptable and have fewer negative effects than synthetic preparations, according to the study. The aforesaid combination formulation of clove oil and aloe vera tooth gel is completely capable of protecting teeth, maintaining oral hygiene, and demonstrating good antibacterial activity against pathogens.

As a result, the growth of microorganisms inside the mouth cavity is prevented. The combination of clove oil and aloe vera gel in a tooth gel showed that there is a lot of potential for dental research in natural therapies in the future.

The antibacterial activity of a clove oil and aloe vera gel combination formulation against staphylococcus aureus was Found.

After conducting clinical testing on humans, the combined formulations generated from clove oil and aloe vera gel demonstrated considerable results, indicating that they can be used commercially to develop dental gels. Nonetheless, more research is required.

FORMULATED GEL

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	***Author Name –Mr. Sujit Ubale*** *Author Affiliation: University of Mumbai* *Author Address/Institute Address :* IDEAL COLLEGE OF PHARMACY AND RESEARCH, BHAL, KALYAN - 421306, DIST – THANE MAHARASHTRA, INDIA
	***Author Name: Mr. Mohammed Akif Shaikh*** *Author Affiliation: University of Mumbai* *Author Address/Institute Address:* IDEAL COLLEGE OF PHARMACY AND RESEARCH, BHAL, KALYAN - 421306, DIST – THANE MAHARASHTRA, INDIA
	***Author Name: Mr. Shyamsundar Sharma*** *Author Affiliation: University of Mumbai* *Author Address/Institute Address:* IDEAL COLLEGE OF PHARMACY AND RESEARCH, BHAL, KALYAN - 421306, DIST – THANE MAHARASHTRA, INDIA
	***Author Name: Mr. Pankaj Sharma*** *Author Affiliation; University of Mumbai* *Author Address/Institute Address:* IDEAL COLLEGE OF PHARMACY AND RESEARCH, BHAL, KALYAN - 421306, DIST – THANE MAHARASHTRA, INDIA

	***Author Name: Mr. Amit Sharma*** *Author Affiliation : University of Mumbai* *Author Address/Institute Address :* IDEAL COLLEGE OF PHARMACY AND RESEARCH, BHAL, KALYAN - 421306, DIST – THANE MAHARASHTRA, INDIA
	***Author Name: Dr. Smita Takarkhede*** *Author Affiliation : University of Mumbai* *Author Address/Institute Address :* IDEAL COLLEGE OF PHARMACY AND RESEARCH, BHAL, KALYAN - 421306, DIST – THANE MAHARASHTRA, INDIA