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Research Article

Formulation And Evaluation of Polyherbal Gel Containing Extract of Ficus Racemosa to Treat Mouth Ulcer

Abhishek Sarvade*, Shivani Patil, Vinayak Dange, Ishwari Mane, Ravina Kamble

Student of AMIPSR, Save.

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ABSTRACT

This study set out to create and assess an oral gel made of herbs that contained aloe Vera and powdered Ficus racemosa leaf extracts for the treatment of mouth ulcers. Indigenous populations around the world view health and culture in large part via the study of traditional medicine. In addition to having strong antimicrobial and antifungal properties, Ficus racemosa leaves are frequently used to cure a number of ailments, such as respiratory and urinary problems, wound liver disease, diabetes mellitus, diarrhea, and inflammatory conditions. While aloe Vera contains phytoconstituents such as minerals, lignin, sugars, vitamins, enzymes, saponins, salicylic acids, and amino acids, Ficus racemosa has certain critical phytoconstituents including tannins, triterpenoids (Lanosterol), sterols, alkaloids, and flavonoids. And applied to wounds on the skin. Ficus Racemosa has key phytoconstituents, including tannins, triterpenoids (lanosterol), sterols, alkaloids, and flavonoids, whereas Aloe Vera comprises phytoconstituents such as vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids, and amino acids. It is utilized to address skin injuries and digestive issues because of its antibacterial, anti-inflammatory, and wound-healing characteristics. The herbal oral gel formulation was created using the following ingredients: Carbopol 934, propylene glycol, methyl paraben, propyl paraben, triethanolamine, aloe vera extract, Ficus racemosa extract, and the necessary quantity of distilled water. Triethanolamine was progressively added to keep the pH of the oral mucosa between 6.7 and 7.2. The physicochemical properties of the formulation were assessed, including its pH, Spreadability, viscosity, extrudability, gelling strength, and antioxidant activity. The findings showed that all physicochemical parameters were within the normal range in the optimized herbal oral formulation that contained extracts from Ficus racemosa and aloe Vera leaves. The formulation's antioxidant testing showed good results when compared to the standard. The produced herbal oral formulation proved safe, effective, and stable when used to treat mouth ulcers.

***Corresponding Author:** Abhishek Sarvade

Address: Student of AMIPSR, Save.

Email ✉: abhisarvade9899@gmail.com

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INTRODUCTION

Aphthous stomatitis, another name for mouth ulcer, is frequently indicated by recurrent mouth and neck ulcers.¹ One mouth ulcer is a little sore or abrasion that develops at the base of the gums or inside the mouth. sometimes referred to as canker sores or aphthous ulcers. They happen when the mucous membrane lining the mouth breaks or becomes disrupted. Usually, these ulcers manifest as tiny, yellow or white indentations. A number of things might cause them, such as biting the inside of the cheek by accident, food allergies, brushing your teeth too vigorously, hormonal changes, vitamin deficiencies, bacterial infections, or specific medical conditions². According to studies, almost 25% of all medications in wealthy nations like the US are plant-based. In contrast, this number is more than 80% in countries that are developing quickly, like China and India. This demonstrates how much more valuable medicinal plants are economically in India than in much of the rest of the globe. Approximately two-thirds of the herbs used in contemporary medicine come from these nations, and traditional healing practices are still crucial to the provision of healthcare to rural communities. Better patient tolerance, fewer side effects, and the disadvantages of synthetic medications are the main reasons for the increased popularity of plant-based therapies. Additionally, studies indicate that oral ulcers may benefit from the use of plant extracts or components as mouthwashes, pastes, or mucoadhesive gels³.

MATERIAL AND METHOD:

Material: Methyl paraben, propyl paraben, propylene glycol, carbopol 934, and distilled water, among others.

Method:

Collection of the Plant Material

Running tap water and distilled water were used to wash the collected plant leaves. Following 3- 5 days of sun drying at room temperature, washed leaves were ground into a fine powder. They were then used for solvent extraction after being stored in an airtight container.

Authentication: Prof. Dr. N.D. Patil of Mahavidyalaya, Malkapur-Perid Kolhapur, Maharashtra, authenticates plant specimens.

Extraction Process

Soxhlet Apparatus Extraction

For 24 hours, the 50g powdered material was extracted using methanol as the solvent in a Soxhlet system. A distillation flask, a condenser, and a thimble to contain the solid sample make up the Soxhlet apparatus. The solvent is heated, evaporated, and then condensed during the extraction process.

Identifying the phytochemical components of the phenolic extract

In order to discover several phytochemical elements, such as alkaloids, flavonoids, phenols, quinones, tannins, cardiac glycosides, steroids, and terpenoids, this study conducted qualitative chemical analysis of methanol extract.

Preparation Of Gel:

For the entire night, a suitable quantity of Carbopol 934 was soaked in distilled water. It was combined with more distilled water the following day while being constantly stirred in a mechanical shaker. Separately, a solution was made with different quantities of Ficus racemosa and Aloe Vera gel extract, as well as the necessary amounts of propyl and methyl paraben, and it was



constantly agitated. Propylene glycol was also used in this mixture. The Carbopol 934 combination was then fully mixed with the resultant solution while being constantly stirred. Triethanolamine was used to modify the pH and distilled water was used to get the final volume down to 30 ml in order to achieve the proper gel consistency. F1 through F3, three different herbal gel compositions, were created.⁴

Evaluation Of Prepared Gel

- Evaluation of the prepared gel formulation was done based on the following parameters.
- Physical evaluation:
- Color: The formulation's color was assessed based on appearance.
- Consistency: By putting it to the skin, the formulation's consistency was examined.
- Odour: The odour of the formulation was evaluated by mixing the gel with water and sniffing it.
- PH determination: The produced gel formulation's PH was ascertained using a PH meter.⁵
- Percentage yield: To find the practical yield, weigh the empty gel formulation container first, followed by the gel formulation container again. The weight of the empty container is then deducted from the weight of the gel formulation container. The yield percentage was then calculated using the following formula.

$$\text{Percentage yield} = (\text{practical yield} / \text{theoretical yield}) \times 100$$

Homogeneity: Visual examination was used to test every manufactured gel composition⁶.

Viscosity: A Brookfield viscometer equipped with spindle number 1 was used to measure it.⁷

Spreadability: is the duration, expressed in seconds, required for two slides to disengage from the gel placed between them at a particular tension. If splitting two slides takes less time, spreadability is increased.⁸ the formula is used to calculate Spreadability.

- $M \times L \times T = \text{Spreadability}$
- In this case, weight is denoted by M that is fastened to the upper slide.
- Slide's length is denoted by L
- The time required to separate the slide is denoted by T.

Extrudability: The prepared gel was put into the typical capped, detachable aluminum tubes, then the ends were sealed with a crimp. The filled tubes were clamped when their weight was positioned between two glass slides. After covering the slide with a 500g weight, the cap was taken off to extrude. Weighing the amount of extruded gel was done. Extrudability was determined by calculating the percentage of extruded gel.

- It is considered outstanding Extrudability when it surpasses 90%.
- Extrudability is favorable when it is higher than 80%.
- Extrudability is considered fair when it exceeds 70%.⁹
- Clarity: Visual appearance was used to assess each of the three batches' clarity.¹⁰
- Gel Strength: The strength of the gel was determined by timing how many seconds it took for the weight to penetrate it.⁶

Antioxidant activity: 11, 12

DPPH (1, 1-Diphenyl-2, Picryl-Hydrazyl) was used to evaluate the sample compounds' antioxidant properties. Free radicals in order to determine their capacity to scavenge free radicals (George et al., 1996). 100 μ L of the test chemical



water was added to the micro titer plate. After covering the samples with 100µL of 0.1% methnolic DPPH, they were placed in a dark place for half an hour. The samples were next checked for discoloration; an Elisa plate reader was used to read the plate at 490 nm. A strong positive was defined as a change from purple to pale pink or yellow. The following formula was used to determine the radical scavenging activity:

$$\text{DPPH radical scavenging activity (\%)} = \frac{[(\text{Absorbance of control} - \text{Absorbance of test Sample}) / (\text{Absorbance of control})] \times 10}$$

RESULT AND DISCUSSION:

Phytochemical evaluation of *Ficus racemosa* leaves extract. The phytochemical components found in the extract were listed in this investigation. Table no 2 presents the study finding

Evaluation parameter of gel formulation:

The created gel formulation was subjected to various physical properties is indicated in following table No 3. Gel were found to be translucent appearance and were green in color. The PH ranged between 6.5 to 7. It was discovered that the gel did not cause any irritation.

Antioxidant Activity

An absorption band in ethanol solution with a center at about 517 nm is indicative of the deep violet color. is also influenced by the delocalization of electrons. A reduced form that loses its violet hue is created when a DPPH solution is combined with a substrate (AH) that has the ability to donate a hydrogen atom. As seen in table no. 4, these compounds showed good activity when compared to the standard at a concentration of 1000 µg/ml.

CONCLUSION:

Natural remedies are more commonly used since they are believed to be less harmful and safer than synthetic drugs. These days, there is an increasing demand for herbal formulations worldwide. It's a great attempt to make an herbal gel with aloe Vera and *Ficus racemosa* extract. According to the data in this investigation, the herbal gel formulation F3 (mixed) that was created has a high degree of therapeutic efficacy and is a viable, affordable, and unquestionably high-potential medication delivery method. The conclusion showed that a combined dose form produced a new herbal gel formulation with strong antioxidant activity, making it safe, stable, and efficient in treating mouth ulcers.

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Formulation Table: ⁴

Table No. 1 Formulation table

Sr. No.	Ingredients	F1
1	Ficus Racemosa	4ml
2	Aloe Vera	-
3	Carbopol 934	20gm
4	Methyl paraben	0.2gm
5	Propyl paraben	0.1gm
6	Propylene glycol	2 ml
7	Water	q.s.

Table No. 2 List of Phytochemicals Constituents Found in The Ficus Racemosa Leaf Extract.

Sr. No.	Test	Observation	Inference
1	Test for phenol	Blue or orange color	Phenol present
2	Test for flavonoid	An intense yellow color was produced in the plant extract which become colorless on addition of few drops of dilute acid	Flavonoid present
3	Test for quinones	Formation of red color	Quinones present
4	Test for tannin	Formation of bluish black or greenish black precipitate	Tannin present
5	Test for cardiac glycoside	A brown ring of the interface	Cardiac glycoside present
6	Test for steroids	The upper layer turns red and sulphuric acid layer shown yellow with green fluorescence	Steroids present
7	Test for terpenoids	Greenish ppt	Terpenoids absent



Table No. 3 Evaluation parameter of gel formulation

Sr. No.	Parameter	F1	F2	F3
1	Color	Yellowish green	White	Yellowish green
2	Consistency	Good	Good	Good
3	Odour	Characteristics	Characteristics	Characteristics
4	Percentage yield	96%	97%	98%
5	PH	6.8	7.1	6.5
6	Homogeneity	Good	Good	Good
7	Viscosity	4800	4700	4500
8	Spreadability	20.85 g.cm/sec	22.46 g.cm/sec	24.33 g.cm/sec
9	Extrudability	78%	77%	85%
10	Gelling strength	35 sec	40 sec	26 sec

Table No. 4 Effect of Plant of Extracts by Using Antioxidant Activity by DPPH (96 Well Method)

Sample code	Concentration µg/ml	Absorbance	Mean	% inhibition
Control	-	1.876 1.987 1.870	1.911	
STD	1000µg	0.340 0.356 0.349	0.348	81.78
Sample-A	1000µg	1.342 1.359 1.387	1.362	28.72



Fig No.1 Ficus Racemosa Extraction



Fig No.2 Antioxidant Activity Analysis

