



Formulation and Evaluation of Polyherbal Gel for the Treatment of Mouthulcers

Anjali Chopade¹, Prof. Vaibhav Deshpande², Anita Manekar³, Vishal Ladole⁴

Research Scholar¹, Assistant Professor², Research Scholar³, Research Scholar⁴

Ishwar Deshmukh Institute of Pharmacy, Digras, Yavatmal, Maharashtra,

India¹²³⁴

ABSTRACT: The goal of the study is to treat mouth ulcers, often known as canker sores, by creating and evaluating a pharmaceutical gel made of natural substances including aloe vera, curcumin, and Glycyrrhiza glabra. Numerous things can cause these ulcers, such as food allergies, hormone imbalances, poor dental hygiene, infections, stress, indigestion, mechanical injury, iron, vitamin B12, and vitamin C deficiencies, and skin illnesses. The decision to investigate herbal medicines stems from the belief that they are safer and have fewer adverse effects than synthetic drugs.

The various amounts of essential chemicals as well as preservatives such carbopol 934, PEG 400, and methyl paraben are tested to make the gel. To guarantee the safety and effectiveness of the gel, a number of factors including pH, viscosity, spreadability, mucoadhesion, and drug release were carefully examined. The outcomes showed encouraging therapeutic efficacy, especially when it came to the gel's capacity to stick to the oral mucosal membranes.

KEYWORDS: Mouth ulcer, Pharmaceutical gel, Aloe Vera, Curcumin, Glycyrrhiza glabra

1.INTRODUCTION:

For the treatment of various skin conditions, about 80% of the world's population still primarily relies on traditional medications. Due to reports that herbal medicines are safe and have few adverse effects especially when compared to modern drugs there has been a gradual resurgence of interest in the use of medicinal plants in poor nations in recent years. The extensive use of topically applied herbal therapies and their unclear benefit/risk ratio have drawn a lot of attention.

As one of the greatest substitutes for artificial and natural medicines, herbal remedies are still utilized in traditional medicine and other items. In this study, oral ulcers are treated using a medicinal gel that contains a combination of Curcumin, Aloe Vera and Glycyrrhiza Glabra.

Mouth ulcers are painful lesions that develop in the mucous membranes of the mouth. They are sometimes referred to as oral ulcers or mucosal ulcers. Often called aphthous sores, these ulcers are round or oval in shape and develop inside the lips or cheeks. They are often white or yellow in color and resemble mucous membrane pressure sores, which are typically located in the middle of the mouth. Significant discomfort is caused by mouth ulcers, particularly when eating, drinking, or brushing teeth. Mouth ulcers are a common issue but understanding their causes can help in managing and preventing them effectively.



Maintaining tight contact with the mucous membrane, the absorption tissue, the Muco adhesive drug delivery system releases the medication at the site of action, improving its bioavailability and producing both local and systemic effects. The extended residence duration at the absorption site, which permits enhanced contact with the epithelial barrier, is the basis for the possible application of mucoadhesive systems as drug carriers. It is possible to integrate the concepts of bioadhesion and stimuli-sensitive medication delivery systems. Bio adhesion has the potential to extend the drug's duration of residence and its contact area at the site of action. This will have an advantage over the widely used semisolid preparations and gels, which are easily removed by salivation. The gel's thermoreversible properties will make administration simpler.

Aloe vera, curcumin, and Glycyrrhiza glabra (licorice root) are widely recognized for their healing and anti-inflammatory qualities, which make them useful components in the management of oral ulcers. Famous for its calming and anti-inflammatory properties, aloe vera helps ease ulcer healing. Its gel may be placed directly to the ulcer, creating a barrier that helps hasten healing. Curcumin, the main ingredient in turmeric, has potent antibacterial, anti-inflammatory, and antioxidant properties. It can greatly lessen inflammation and speed up the healing of mouth ulcers. Applying a gel containing curcumin directly to the afflicted area can help reduce the ulcer's size and severity. Licorice root, or Glycyrrhiza glabra, contains glycyrrhizin, which is known for its anti-inflammatory, antiviral, and antimicrobial properties. This makes it effective in reducing pain and inflammation while speeding up the healing process of mouth ulcers. Licorice root extract can be incorporated into a gel to enhance its healing properties and provide additional relief from pain.

2.MATERIAL AND METHOD:

Materials :

- Aloe Vera extract
- Curcumin extract
- Glycerrhiza glabra extract
- Carbopol 934 (Gelling agent)
- Glycerine
- Honey
- Paperminth oil
- Propylene Glycol 404
- Methyl paraben, Propyl paraben (Preservatives)
- Triethanolamine (Antioxidant)

Methods :

- **Extraction of curcumin :**

The curcumin is extracted from the turmeric by the process of maceration with the solvent ethanol and water in the ratio of 7:3 respectively for period of 3 successive days followed by the process of filtration and eavaporation of the solvent.



- **Extraction of Glycyrrhizin :**

The Glycyrrhizin is extracted from the Liquorice by the process of maceration with the solvent water and ethanol in the ratio of 7:3 respectively for period of 2 successive days followed by the process of filtration and eavaporation of the solvent.



- **Extraction of Aloe Vera gel :**

The extraction of aloe vera gel begins with harvesting mature leaves, followed by washing to remove any dirt. The outer rind of the leaf is then carefully removed to expose the inner gel. This gel is scooped out and ground to achieve a smooth consistency. The ground gel undergoes filtration to remove any remaining impurities.



3.PROCEDURE:

Preparation of Herbal Gel :

The formulation of the herbal gel was carried out by using gelling agents, including Carbopol 934.

- **Dispersion of Gelling Agent:**

Carbopol 934, the gelling agent of choice, was mixed with enough distilled water. The beaker containing the gelling agent and water was placed on a magnetic stirrer running at room temperature (RT) at 500 rpm in order to achieve this dispersion. Stirring contributed to ensuring that the gel had the proper consistency.

- **Swelling of Gelling agents :**

After the gelling agent was mixed with water, the beaker was left for around an hour. As a result, the gelling agent was able to expand, taking in water and creating a structure resembling gel. The ultimate consistency and texture of the gel are determined by swelling, which is an essential phase in the gel formulation process.

- **Preparation of Preservative:** In a separate beaker the Preservative were dissolved in distilled water with gently heating the beaker on a water bath at a specific temperature for dissolution. After the solution cooled down, propylene glycol was added to it.

- **Additiona of Prepared Exact :**

Add Glycyrrhiza glabra and the produced extract of curcumin to the mixture. To guarantee that the extract was distributed uniformly throughout the solution, it was well mixed. In this phase, the herbal component is added to the gel formulation, potentially imparting medicinal characteristics.

- **Incorporation into Gelling Agent Mixture:**

The preservative solution containing the herbal extract, honey , Aloe vera extract and other additives was then added to the gelling agent dispersion. Continuous stirring was maintained throughout this process to ensure proper mixing and uniform distribution of all components.

4. EVALUATION:

4.1. Visual appearance

A visual inspection of an herbal gel, such as one made from aloe vera, curcumin, and Glycyrrhiza glabra (licorice root), involves examining several key characteristics to ensure the product's quality and effectiveness. The clarity of the gel should be maintained, appearing clear to semi-translucent, with no visible particles or contaminants, as these could indicate poor mixing or contamination. The gel should

emit a mild, pleasant herbal aroma consistent with the scents of aloe vera, turmeric, and licorice, without any strong or unpleasant odors that might suggest spoilage or poor-quality ingredients.

4.2 Measurement of pH

The pH level of the gel should be neutral to slightly acidic (around 5.5 to 7) to ensure it is gentle on the mouth's mucosal tissue.

The pH of formulations was determined by using digital pH meter. 1g of gel was dissolved in 100ml of distilled water and kept aside for 2 hours.

4.3 Measurement of Homogeneity :

Once the gels have been established in a beaker, the homogeneity is examined visually to see if any aggregates or gritty materials are present.

4.4 Extrudability:

The gel formulations are first filled into standard capped collapsible aluminum tubes and sealed at the end. To measure extrudability, the tube is pressed at the end using the thumb, and the ease with which the gel is extruded from the tube is observed. A well-formulated gel should extrude smoothly with moderate pressure applied by the thumb, indicating good consistency and user friendliness.

4.5 Spreadability:

The amount of time, measured in seconds, that it takes for two slides to separate from gel positioned in between them when a specific stress is applied is known as spreadability. The better the spreadability, the shorter the time required to separate two slides.

The spreadability can be calculated by the formula;

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

Where, S= spreadability

M = weight tied to upper slide

L = length of glass slides

It was shown in the current investigation that the produced herbal gel formulation has a significant, clinically effective, appropriate, low-cost, but unquestionably high-potential drug delivery medium.

A novel herbal gel composition that has been developed is effective in treating mouth ulcers.

Because natural therapies are thought to be safer and have fewer adverse effects than synthetic medications, they are more widely accepted. Herbal formulas are becoming more and more popular on the global market these days. The attempt to create a herbal gel comprising liquorice extract ,Aloe extract and turmeric rhizome extract is excellent. The outcome demonstrated that the novel herbal gel formulation

with strong antifungal and anti-inflammatory properties was created as a result of the combined dosage form, making it safe, stable, and good for mouth ulcer treatment. T = time taken to separate the slides

Result and Discussion :

The prepared polyherbal gel demonstrated homogeneity and thorough mixing with its smooth, uniform exture and constant yellowish-brown color. Visual appeal and quality assurance were guaranteed by the semi-translucent look. Extrudability tests revealed that the gel extruded from typical capped collapsible aluminum tubes with moderate thumb pressure in a smooth and consistent manner, suggesting that its viscosity and user-friendliness were suitable. An analysis of the gel's strength showed that, on average, 165 grams of force were needed to pierce the polyherbal gel, with a range of 150 to 180 grams. This demonstrated sufficient structural integrity, guaranteeing that the gel will be able to hold its shape and stick to mucosal surfaces effectively for an extended period of time. The gel was able to stay in touch with the mucosal surface for an extended period of time due to its strong adhesive qualities and high swelling index.

The resulting polyherbal gel's consistent yellowish-brown hue and smooth, uniform texture showed evidence of thorough mixing and homogeneity. The semi-translucent appearance guaranteed both visual appeal and quality assurance. Extrudability tests showed that the gel's viscosity and user-friendliness were appropriate since it extruded from standard capped collapsible aluminum tubes with modest thumb pressure in a smooth and consistent way. An examination of the strength of the gel revealed that, within a range of 150 to 180 grams, an average of 165 grams of force was required to pierce the polyherbal gel. This proved to have adequate structural integrity, ensuring that the gel will be able to maintain its form and adhere to mucosal surfaces successfully for a long time.

Because of its high swelling index and strong adhesive properties, the gel was able to adhere to the mucosal surface for a considerable amount of time.

Conclusions :

The results of this investigation demonstrated that the produced herbal gel formulation has a significant, appropriate, affordable, clinically effective, and definitely high-potential drug delivery vehicle. A recently found herbal gel composition has shown promise in the management of oral ulcers. Because they are thought to be safer and to have fewer negative effects, natural therapies are more commonly accepted than manufactured medications. These days, herbal remedies are becoming more and more well-liked on the global market. Using licorice, aloe, and turmeric rhizome extract to create a herbal gel is a commendable endeavor. Based on the combined dosage form, a novel herbal gel formulation with strong antifungal and anti-inflammatory properties was created, which is safe, stable, and appropriate for oral use, according to the results.

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