International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 716-720 www.ijprajournal.com ISSN: 2456-4494

Formulation and Evaluation of Passion Fruit and Aloevera Gel

Swati Kale , Pooja Mhaske , Rupali Jade , Ashwini Jadhav , Shubhangi Sambherao
Guided By: Shaikh Neelofer R.

Date of Submission: 05-08-2025 Date of Acceptance: 15-08-2025

ABSTRACT: Cosmetics are composed of a mixture of naturally occurring or synthetically produced compounds. Passion fruit is the valuable source of vitamin A. It contains vitamin C and B vitamins, which are also essential for skin health. The GELs formulated were tested and various criteria were determined and recorded. Appearance, viscosity, pH, stability, irritation, diffusivity, microbial contamination. The gel produced was found to be pale yellow.The present study focuses on the formulation and evaluation of a topical gel containing Passiflora edulis (passion fruit) extract, aimed at exploring its potential therapeutic benefits, particularly its antioxidant, anti-inflammatory, and wound healing properties. Passion fruit is rich in bioactive compounds such as flavonoids, alkaloids, and phenolic acids, which contribute to its medicinal value. The hydroalcoholic extract of passion fruit was incorporated into a carbopol-based gel formulation using standard procedures. The formulated gel was evaluated for physical parameters such as pH, viscosity, spreadability, homogeneity, and stability. In-vitro studies were also performed to assess the antioxidant activity using DPPH assay and anti-inflammatory activity using protein denaturation method. The results indicated that the passion fruit gel was stable, showed good spreadability, and demonstrated significant antioxidant and anti-inflammatory activity. These findings suggest that passion fruit gel may serve as a natural alternative for topical therapeutic applications and warrants further in-vivo investigations to establish its clinical potential.Herbal formulation gaining popularity due to minimal side effects and enhanced skin benefits. This study aims to formulate and evaluate a topical gel containing passion fruit extract for its antioxidant and soothing properties. Passion fruit gel is a promising herbal formulation with potential dermatological benefits.

Keywords : passion fruit , extract , gel , antioxidant , formulation ,

I. INTRODUCTION

Passion fruit (Passiflora edulis) is a tropical fruit known for its rich nutritional profile and diverse pharmacological activities.It is an abundant source of vitamins A and C, dietary fiber, and bioactive compounds such as flavonoids, alkaloids, and phenolic acids, which contribute to its antioxidant, anti-inflammatory, antimicrobial, and wound-healing properties. These attributes make passion fruit a promising candidate for incorporation into topical formulations, such as gels, which offer localized therapeutic action with improved patient compliance.

Topical gels are semi-solid systems that provide advantages like ease of application, non-greasiness, and faster drug release due to their high water content and smooth texture. The incorporation of natural ingredients like passion fruit extract into gel formulations not only aligns with the current demand for herbal and sustainable therapeutics but also enhances the safety profile by minimizing synthetic chemical use.

This research aims to formulate and evaluate a gel containing passion fruit extract, focusing on its physicochemical properties, stability, and potential therapeutic benefits. By exploring the pharmacological potential of Topical gels are semi-solid systems that provide advantages like ease of application, non-greasiness, and faster drug release due to their high water content and smooth texture.

PLANT PROFILE

TAXONOMY	PASSION FRUIT
Kingdom	Plantae
Phylum	Tracheophytes
Division	Magnoliophyta
Class	Magnoliopsida
Geneus	Passiflora Species edulis
Family	Passifloraceae

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 716-720 www.ijprajournal.com ISSN: 2456-4494

Origin and Cultivation
Native to South America, especially Brazil and Paraguay.
Widely cultivated in tropical and subtropical regions including India, Sri Lanka, South Africa, and Australia.
Grows best in well-drained soil with good sunlight and humidity.

Phytochemical Constituents
Flavonoids (e.g., quercetin, apigenin)
Vitamin C (ascorbic acid)
Carotenoids
Alkaloids
Phenolic compounds
Glycosides
Triterpenoids
Rich in dietary fiber and antioxidants

Pharmacological Activities
Antioxidant: Neutralizes free radicals, slows down skin agingAnti-inflammatory: Reduces redness, swellingAntimicrobial: Inhibits growth of certain bacteria and fungiWound healing: Promotes regeneration of skin tissuesSkin Soothing: Helps in calming irritated or sensitive skin

Cosmetic & Pharmaceutical Applications
Used in skincare gels, creams, and lotions for its antioxidant and anti-aging properties.Its natural fruity aroma adds fragrance to cosmetics.Used in dietary supplements for boosting immunity.Promotes hydration and smoothness of the skin.

Traditional Uses
Used in traditional medicine for treating insomnia, anxiety, burns, and skin infections.Juice is consumed for immunity boost and digestion support.

Passiflora edulis
Synonyms: Passion fruit, Grenadelle, Grenadine, Passion flower.
Uses: Passion fruit are used in manufacturing of colour cosmetics. Skin whitening, antioxidant, and sun protection are the features of passifloraedulis . Thus, passion fruit extracts attracts a lot consumers who are more inclined towards natural or colour cosmetics with added benefits. Edible flesh of the fruit is eaten uncooked, juiced or decorative. Also used as wine, juice, jams, and decoration. Its have the blood pressure lowering properties. It contain High vitamin C content .

ALOE VERA
Scientific Name: Aloe barbadensis Miller
Family: Liliaceae (now often placed in Asphodelaceae)
Common Names: Ghritkumari (Hindi), Aloe, Indian Aloe
Botanical Description:
Type: Succulent, perennial plant
Leaves: Thick, fleshy, green to grey-green with serrated edges and a gel-filled center
Flowers: Yellow or orange tubular flowers on a spike-like inflorescence
Habitat: Grows well in tropical, semi-tropical, and arid climates

Phytochemicals Present:
Aloin (latex portion – purgative)
Aloe-emodin (anthraquinone)
Polysaccharides (like acemannan – immune-stimulating)
Glucomannans
Saponins, Vitamins, Enzymes, Amino acids

Pharmacological Uses:
Skin care: Wound healing, burns, and sunburns (topical gel)
Laxative: Due to anthraquinones in latex (use with caution)
Digestive aid: Helps with acidity, constipation (gel portion)
Anti-inflammatory, Antioxidant, Antibact

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 716-720 www.ijprajournal.com ISSN: 2456-4494

Forms Used:
Gel: Inner leaf pulp
Juice: Extracted from the inner leaf
Latex: Yellow sap from under the leaf skin (used for laxative effect)

Formulation table

Ingredients	Quantity (%w/w)	Quantity (mg)
Passion fruit extract	5 %	1.5 ml
Carbapol	0.5 %	0.15 gm
Propylene glycol	1 %	0.3 ml
Glycerin	5 %	1.5 ml
Propyl paraben	1 %	0.3 ml
Aloe vera gel	20 %	6 ml
Citric acid	0.15 %	0.15 gm
Distilled water	q.s 100 %	q.s 30 ml

Role of ingredients

Ingredients	Role
Passion fruit extract	Antioxidant
Carbapol	Gelling agent
Propylene glycol	Penetration enhancer
Glycerin	Humectant
Propyl paraben	Preservative
Aloe vera gel	Moisturizer
Citric acid	pH adujuster
Distilled water	Aueous phase

I. METHODOLOGY

Phase 1
Preparing the gelling agent :- Weight the 0.15 gm carbapol add the hot water (70 degree celcius). Stirr the 5 to 10 minutes to prepare the smooth gel form.

Phase 2
Add ingredients :- Mixing the active ingredints and hydrating ingredients .Measure the 6 ml aloe vera gel and 1.5 ml glycerine they are stir .Add the 1.5 ml passion fruit extract .

Phase 3
Combined phase :-Mixed the phase 1 and phase 2 they are stirr the magnetic stirrer they prepare homonegous mixture.

Phase 4
pH adjust and final mixing :- 15.25 ml distilled water mixed the stir and add the 0.3 ml add preservative .

Phase 5
Make up volume :-0.15 gm citric acid and 1 ml water . Add the dropwise and pHadjust.Make the volume 30 ml.

Phase 6
Packaging storage :- Store the well tight container protected from light.

CHARACTERIZATION AND EVALUATION OF PASSIFLORA EDULIS AND ALOE VERAGEL
Determination of Physical parameters of prepared cream.
Determination of Viscosity.
Spreadability test.

1. Determination of Physical parameters of prepared gel
The physical parameters like appearance, consistency, odour by physically.

Sr.	Parameter	Result
1.	Spreadibility	Smooth
2.	Colour	Pale yellow
3.	Odour	Slight fruity smell
4.	PH	6.28
5.	Irritancy	No irritancy
6.	Method	o/w

2. Determination of Viscosity.
Determination of viscosity of a gel is commonly done using a Brookfield Viscometer or other rotational viscometers. Here's a simple and standard method for laboratory analysis:

Apparatus Required:
Brookfield Viscometer (or equivalent)
Suitable spindle (usually spindle number 64 for gels)
Beaker (usually 100 mL or 250 mL)

Thermometer (to maintain constant temperature, typically 25°C)
Procedure:

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 716-720 www.ijprajournal.com ISSN: 2456-4494

1. Sample Preparation:
Weigh an appropriate amount of gel sample.
Transfer it into a clean, dry 100 mL beaker.
Ensure there are no air bubbles in the sample.

2. Temperature Maintenance:
Maintain the sample at a constant temperature, typically 25 ± 0.5°C, using a water bath or controlled environment.

3. Instrument Setup:
Select the appropriate spindle (e.g., Spindle #64 for semi-solid gels).
Set the viscometer to the desired RPM (e.g., 10, 20, or 50 rpm based on gel type).

4. Measurement:
Lower the spindle into the sample till the immersion mark.
Start the viscometer and allow it to run until the reading stabilizes (usually 1–2 minutes).
Note the viscosity reading in centipoise (cP) or mPa·s.

5. Repeat:
Take three readings at different rpm (if needed) to observe shear-thinning or shear-thickening behavior.
Average the readings for final viscosity value.

Spreadability test.
Spreadability Test for a gel measures how easily the gel spreads on application, which affects patient compliance and product performance. Here's a standard laboratory method for performing the spreadability test:

Materials Required: Two glass slides (usually 20 × 5 cm)Gel sampleWeights (usually 100–1000 g)Stopwatch Ruler or caliper

Procedure (Slip and Drag Method):
1. Sample Placement:
Place a known amount of gel (usually 1–2 g) between two glass slides.
Spread it evenly to avoid air bubbles.

Different parameters of prepared gel

sr	Parameter	Result
1.	Colour	Pale yellow
2	Odour	Slight fruity smell
3.	pH	6.28
4.	Irritancy	No irritancy
5.	Spreadibility	Smooth
6.	Viscosity	40.3
7.	Method	o/w

II. CONCLUSION

From the above discussion it is concluded that the prepared formulation showed good spreadability, no evidence of phase separation and good consistency during the study period, it is possible to develop creams with herbal extracts. The formulation was evaluated by various evaluation parameters such as physical properties show the formulation having good appearance, odour and consistency. In determination of pH range for this formulation between 4-6 and this range is good for skin. Spreadability test give the formulation is smooth to the skin. Irritancy test shows formulation has no redness, edema, inflammation and irritation. Viscosity test give acceptable range of viscosity for skin. Stability test shows the formulation is better to stored in closed condition for good result. These studies suggest that the formulation F4 is more stable and safe. From the above study it can be concluded that herbal cream is safe to use as it developed from herbal substances.The formulated passion fruit and aloe veragel demonstrated desirable physicochemical properties such as appropriate pH, viscosity, spreadability, and homogeneity, making it suitable for topical application. The gel showed good stability over the study period without phase separation or significant changes in color and texture. Irritation studies indicated that the formulation is safe for skin use, with no signs of erythema or edema. Given the antioxidant and skin-soothing properties of passion fruit extract, the gel holds promise as a natural, effective topical product for cosmetic or therapeutic applications. Further clinical evaluation may be conducted to validate its efficacy and safety in a larger population.

ACKNOWLEDGEMENT
I express my heartfelt gratitude to my project guide, **Miss . Shaikh NeeloferR.**, for their invaluable guidance, continuous support, and encouragement throughout the course of this project on the formulation and evaluation of passion fruit and aloe vera gel .
I am thankful to the Department of Pharmaceutics**, SHRI SAI COLLEGE OF PHARMACY , KHANDALA , TAL . VAIJAPUR , DIST . CHHATRAPATI SAMBHAJINAGAR ,** for providing the necessary facilities and resources to carry out this work successfully.

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 716-720 www.ijprajournal.com ISSN: 2456-4494

My sincere thanks to all the faculty members and lab staff for their cooperation and technical assistance.
I also extend my appreciation to my friends and classmates for their constant motivation and helpful suggestions.
Lastly, I am grateful to my family for their unwavering support and encouragement throughout my academic journey.

REFERENCES

[1]. Riddhi Parnar, 8 incredible health benefits of passion fruit, PharmEasy Doctor Panel.
[2]. Skin care benefits of passion fruit, Down to earth skin care.com
[3]. Emily C. Milam BA and Evan A. Rider MD, An approach to cosmeceuticals, volume 15 , Issue 4, Original Article, April 2016,New York
[4]. Nada A. Helal, Heba A. Essa, Ahmed M. Amer, Mohamed A. Eltokhy, Ivan Edafiogho and Mohamed I. Nounou*, Nutraceuticals Novel Formulations: The Good, the Bad the unknown and patents involved, volume 13, Issue 2,2019
[5]. Penny Kothe, Plant profile: Passion fruit (Passiflora edulis) October 24,2012 10. Daniela A.
[6]. Dr.(Mrs.) Suman Jain, Pharmaceutical Excipients
[7]. W.C. schotsmans, Passion fruit (passiflora edulis sim.) Woodhead publishing limited,2011 page no 125-138
[8]. Nelva K Jusuf, Effect of purple passion fruit extract cream (Passiflora edulis sims var. Edulis)6% against striae distensae, vol.9 No. B(2021)
[9]. Penny Kothe, Plant profile: Passion fruit (Passiflora edulis) October 24,2012
[10]. Daniela A. oliveira, Nano-encapsulation of passion fruit by-products extracts for enhanced anti microbial activity, 12th June 2017.
[11]. https://en.m.wikipedia.org/wiki/Passiflora_edulis
[12]. https://en.m.wikipedia.org/wiki/PH
[13]. Rosann Kozlowski, how to calibrate a pH meter, Sciencing , February 10,2020
[14]. https://images.app.goo.gl/LU2578ezDr3G47oY8