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FORMULATION AND EVALUATION OF ANTIULCER GEL FROM GUAVA LEAVES AND CORDIA DICHOTOMA SEEDS

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ABSTRACT

Peptic ulcer disease is a common gastrointestinal disorder characterized by erosion of the gastric mucosal lining. Herbal medicines have gained considerable attention due to their safety, efficacy, and reduced side effects. The present study aimed to formulate and evaluate an antiulcer gel containing extracts of Guava leaves (Psidium guajava) and Cordia dichotoma seeds. Guava leaves possess antioxidant, anti-inflammatory, and gastroprotective activities, while Cordia dichotoma seeds contain mucilage and bioactive constituents that aid in mucosal protection and wound healing. The herbal gel was prepared using Carbopol 940 as the gelling agent and evaluated for physical appearance, pH, viscosity, spreadability, extrudability, and stability. The formulated gel showed satisfactory physicochemical characteristics and demonstrated potential antiulcer activity due to the synergistic action of both herbal extracts. The study suggests that the developed formulation may serve as a promising herbal alternative for the management of gastric ulcers.

KEYWORDS: Antiulcer gel, Psidium guajava, Cordia dichotoma, Herbal formulation, Carbopol 940, Gastroprotective activity.

INTRODUCTION

Peptic ulcer disease is a chronic disorder affecting the stomach and duodenum and is commonly associated with Helicobacter pylori infection, excessive acid secretion, stress, alcohol consumption, and prolonged use of non-steroidal anti-inflammatory drugs (NSAIDs).[1] Conventional antiulcer therapies, including proton pump inhibitors and H2 receptor antagonists, are effective but may cause adverse effects upon long-term use.[2] Medicinal plants have been extensively investigated for their gastroprotective potential due to the presence of flavonoids, tannins, alkaloids, and phenolic compounds .[3] Psidium guajava (Guava) leaves contain quercetin, tannins, and essential oils that exhibit antioxidant and anti-inflammatory activities contributing to ulcer healing.[4] Cordia dichotoma is a medicinal plant whose seeds are rich in mucilage, polysaccharides, and bioactive compounds that help protect the gastric mucosa and promote tissue regeneration.[5] Combining these herbal ingredients in a topical oral gel system may provide prolonged mucosal contact and enhanced therapeutic benefits.

Therefore, the present work was undertaken to formulate and evaluate an antiulcer gel containing Guava leaf extract and Cordia dichotoma seed extract for potential gastroprotective activity.

Antiulcer Gel

Antiulcer gels are semisolid formulations designed to provide localized protection and therapeutic action on ulcerated mucosal tissues. They form a protective layer over the affected area, reduce irritation, and enhance healing by maintaining prolonged contact with bioactive compounds.[6] Herbal antiulcer gels have gained popularity due to their natural origin and minimal side effects.

Advantages of Antiulcer Gel

1. Provides prolonged contact with ulcerated tissues.
2. Improves patient compliance.
3. Easy application and administration.
4. Reduced systemic side effects.
5. Enhanced bioavailability of herbal constituents.
6. Cost-effective and eco-friendly formulation.[7]

Disadvantages of Antiulcer Gel

1. Limited drug loading capacity.
2. Possibility of microbial contamination.
3. Stability may be affected by environmental conditions.
4. Requires suitable preservatives.
5. Shorter shelf life compared to some conventional dosage forms.[7]

Formulation of Antiulcer Gel

Table 1: Composition of Antiulcer Gel (20 g).

Sr.No	Ingredients	Quantity		
		F1 (gm)	F2 (gm)	F3 (gm)
1.	Guava Leaf Extract	1g	1g	1g
2.	Cordia dichotoma Seed Extract	1g	1g	1g
3.	Carbopol 940	0.4g	0.4g	0.4g
4.	Glycerin	2ml	2ml	2ml
5.	Propyl Paraben	0.02g	0.02g	0.02g
6.	Triethanolamine	q.s	q.s	q.s
7.	Purified water	up to 20 g	up to 20 g	up to 20 g

Method of Preparation

1. Carbopol 940 was dispersed slowly in purified water and allowed to hydrate for 24 hours.[8]
2. Guava leaf extract and Cordia dichotoma seed extract were dissolved in a small quantity of water.
3. Methyl paraben and propyl paraben were dissolved in propylene glycol.
4. The preservative solution was added to the hydrated Carbopol gel with continuous stirring.
5. Herbal extracts were incorporated gradually into the gel base.
6. Triethanolamine was added dropwise to adjust the pH and obtain the desired gel consistency.
7. The final gel was mixed thoroughly to ensure uniform distribution of ingredients and stored in airtight containers.[8]

Evaluation of Antiulcer Gel

1. Physical Appearance

The gel was visually examined for color, homogeneity, consistency, and presence of any particulate matter.[9]

2. pH Determination

The pH of the formulation was measured using a calibrated digital pH meter at room temperature[9]

3. Viscosity

Viscosity was determined using a Brookfield viscometer at appropriate spindle speed and temperature[9]

4. Spreadability

Spreadability was determined by placing the gel between two glass slides and measuring the time required for separation under specified weight[10]

5. Extrudability

Extrudability was evaluated by determining the force required to extrude the gel from a collapsible tube.[10]

6. Homogeneity

The formulation was examined visually after application on a glass slide to ensure uniformity[10]

4. Transparency

The 1 gm gel formulation taken in 10 ml test tube and visually checked for its transparency.

7. Stability Study

The prepared gel was stored at room temperature and accelerated conditions for three months and evaluated periodically for changes in appearance, pH, and viscosity.[10]

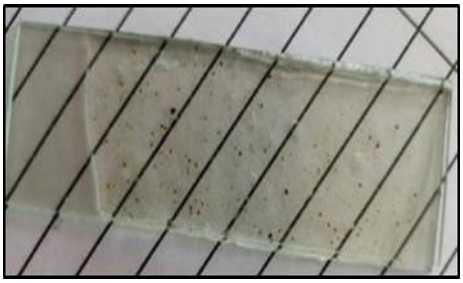

Fig. 1: Spreadability.

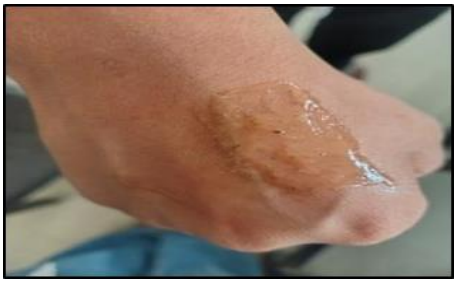

Fig. 2: Irritancy.

RESULT AND DISCUSSION

Evaluation Parameter of Herbal gel was performed.

1. Physical Appearance

Sr. no.	Characters	Observation
1.	Nature	Gel
2.	Colour	Greenish- Brown
3.	Appearance	Semi- transparent

2. Determination of pH.

Sr. no.	Formulation batches		
	F1	F2	F3
1.	Yellowish orange	Yellow green	Green

3. Determination Irritancy Test.

Formulation	Irritancy
F1	Irritancy
F2	Mild irritancy
F3	No irritancy

4. Determination of Stability.

Sr.No.	Parameter	Formulation batches		
		F1	F2	F3
1.	Stability	Passed	Failed	Passed

According to above table stability of F1 and F3 passed and F2 was failed the test .

5. Determination of Transparency

Sr. No.	Parameter	Formulation batches		
		F1	F2	F3
1	Transparency	Opaque	Slightly Transparent	Semi- Transparent

6. Determination of Spreadability.

Sr. No.	Parameter	Formulation batches		
		F1	F2	F3
1.	Spreadability	Slightly spreadable	Moderately spreadable	Easily spreadable

CONCLUSION

The present study was successfully carried out to formulate and evaluate an herbal anti-ulcer gel using Guava leaves extract and Cordia dichotoma seed extract. The prepared formulations were evaluated for different parameters such as pH, viscosity, homogeneity, spreadability, and transparency. The results showed that the gel possessed satisfactory physicochemical properties and good stability. Among the formulations, the optimized batch exhibited better consistency and spreadability suitable for oral application. Hence, the formulated herbal gel can be considered a safe, effective, and economical treatment option for mouth ulcers with minimal side effects.

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