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Review Article

A Review: Antiulcer Buccal Film of Guava Leaf Extract

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ABSTRACT

Guava (*Psidium guajava*) leaf extract has gained significant attention due to its antiulcer properties attributed to its rich content of flavonoids, tannins, and antioxidants. The development of buccal films as a drug delivery system offers a convenient, effective, and non-invasive means of delivering therapeutic agents. This review examines the formulation and evaluation of antiulcer buccal films incorporating guava leaf extract and explores the potential of natural polymers in enhancing film characteristics and drug release. It passes the first pass metabolism and shows action fast. The present study focuses on the development and evaluation of an antiulcer buccal film formulated using guava leaf extract (*Psidium guajava*), known for its potent antimicrobial, antioxidant, and anti-inflammatory properties. The guava leaf extract was prepared and incorporated into a bio adhesive buccal film matrix using polymers like hydroxypropyl methylcellulose (HPMC) and polyvinyl alcohol (PVA). The films were evaluated for physicochemical properties, including thickness, tensile strength, folding endurance, and drug content uniformity. In vitro release studies demonstrated sustained release of active constituents, ensuring prolonged therapeutic action. The antiulcer activity was assessed using an experimental ulcer model, where the films exhibited significant ulcer healing effects, likely due to the phytochemicals such as flavonoids and tannins present in guava leaves. The developed buccal films offer a promising, patient-friendly approach to managing ulcers, improving drug bioavailability, and minimizing side effects compared to conventional oral therapies.[7] [13-17].

INTRODUCTION

Peptic ulcers are a global health concern, often caused by *Helicobacter pylori* infections, NSAIDs, or stress-induced factors. Conventional therapies face challenges such as side effects and poor patient compliance. Buccal drug delivery systems,

particularly buccal films, provide an alternative route that bypasses first-pass metabolism and ensures sustained drug release. Guava leaf extract, rich in bioactive compounds like quercetin and flavonoids, exhibits strong antiulcer properties by reducing oxidative stress, improving mucosal protection, and inhibiting bacterial growth. Peptic

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ulcers are open sores that develop on the inner lining of the stomach, upper small intestine, or esophagus due to the corrosive effects of stomach acid. They are classified into several types based on their location and cause.[1-3]

There are some different types of peptic ulcers they are-

1. **Gastric Ulcer-** A gastric ulcer is a type of peptic ulcer that forms in the stomach lining. Like duodenal ulcers, gastric ulcers are caused by an imbalance between stomach acid and the protective mechanisms of the stomach lining. When this balance is disrupted, the stomach lining becomes damaged, leading to the formation of ulcers. Gastric ulcers are characterized by the erosion of the stomach's mucosal layer, which can lead to inflammation, pain, and potential complications if left untreated. Found in the lining of the stomach .Long-term use of NSAIDs (e.g., aspirin, ibuprofen).Infection with *Helicobacter pylori* .Excessive alcohol consumption or smoking .Pain that worsens after eating .Nausea, bloating, and weight loss.[5]
2. **Duodenal Ulcer-** A duodenal ulcer is a type of peptic ulcer that forms in the duodenum, which is the first part of the small intestine, just beyond the stomach. It is a sore or lesion in the mucosal lining of the duodenum, typically caused by an imbalance between the stomach's digestive acids and the protective mechanisms in the gastrointestinal lining. Occurs in the upper part of the small intestine (duodenum).H. pylori infection is a common factor.Overproduction of stomach acid (e.g., due to stress or genetic predisposition).Pain relieved by eating or drinking milk.Pain typically occurs a few hours after meals or at night.[4][8]
3. **Esophageal Ulcer-** An esophageal ulcer is an open sore or lesion that forms on the lining of the esophagus, the tube that carries food from the mouth to the stomach. These ulcers can be painful and cause significant discomfort, especially when swallowing. Esophageal ulcers are typically caused by acid reflux (gastroesophageal reflux disease or GERD), but they can also result from infections, medications, or other underlying conditions. Develops in the esophagus. Gastroesophageal reflux disease (GERD).Prolonged use of certain medications (e.g., NSAIDs).Chronic alcohol abuse or smoking. Painful swallowing (odynophagia).Heartburn and acid regurgitation.
4. **Stress Ulcer-** stress ulcer is a type of ulcer that forms in the stomach or duodenum (the first part of the small intestine) as a result of severe physical or emotional stress. These ulcers are often associated with critical illness, trauma, surgery, or other extreme stressors that can affect the body's normal physiological functions, especially the production of stomach acid .Unlike the more common peptic ulcers, which are typically caused by infection with *Helicobacter pylori* or the prolonged use of NSAIDs (nonsteroidal anti-inflammatory drugs), stress ulcers are primarily linked to severe stress and can develop quickly, especially in patients who are critically ill. Commonly occurs in the stomach but can appear in the duodenum. Severe physical stress (e.g., critical illness, burns, trauma, or surgery).Reduced blood flow to the stomach lining during stress.Often asymptomatic until complications arise (e.g., bleeding).[9]
5. **Refractory Ulcer-**A refractory ulcer refers to an ulcer that does not heal or respond to standard treatments. It is often used in the context of gastric ulcers (ulcers in the stomach lining) or peptic ulcers (which also include



duodenal ulcers), where the ulcer persists or recurs despite appropriate medical therapy. The term "refractory" indicates that the ulcer is resistant to healing, even after conventional treatments such as proton pump inhibitors (PPIs), antacids, antibiotics (in case of *Helicobacter pylori* infection), and lifestyle changes. Can occur in any part of the gastrointestinal tract. Ulcers that do not heal despite appropriate treatment. Linked to persistent *H. pylori* infection, non-adherence to medication, or Zollinger-Ellison syndrome. Chronic ulcer symptoms with no improvement over time.

6. **Bleeding Ulcer-** A bleeding ulcer refers to an ulcer in the stomach or duodenum (the upper part of the small intestine) that bleeds, which can lead to potentially serious complications. It is often a complication of peptic ulcers, which are open sores that develop on the lining of the stomach or duodenum due to various causes like infection, certain medications, or excessive stomach acid. When a peptic ulcer erodes into a blood vessel, it can cause bleeding, which may range from mild to severe, depending on the size of the vessel affected and the extent of the damage. Found in the stomach, duodenum, or esophagus. Erosion of a blood vessel in an existing ulcer. NSAID overuse or untreated *H. pylori*. Vomiting blood (hematemesis) or black, tarry stools (melena). Sudden, severe abdominal pain.[11]

Ingredients:

Guava Leaves:

Guava, or *Psidium guajava*, is a member of the Myrtaceous family. Antimicrobial, anti-inflammatory, anticancer, anti allergic, anti hyperglycemic, and anti mutagenic properties have all been reported for the plant. It has been used to cure dental diseases, coughs, and wounds.

It has been demonstrated that the flavonoids quercetin, quercetin-3-O-arabinoside, morin-3-O-lyxoside, and morin-3-O-arabinoside, which were all extracted from guava leaves, have strong antibacterial qualities. The different tannins, polyphenolic compounds, flavonoids, ellagic acid, triterpenoids, guayabera, quercetin, and other [10]

Natural Polymers for Buccal Films

Natural polymers, such as sodium alginate, pectin, chitosan, and guar gum, are extensively used for buccal film formulation due to their biocompatibility, biodegradability, and mucoadhesive properties. These polymers ensure uniform drug distribution, enhance film flexibility, and improve patient acceptability.[11]

Key advantages of natural polymers include:

1. Biodegradability: Ensures environmentally friendly processing.
2. Non-toxicity: Reduces risk of adverse reactions.
3. Film-forming properties: Produces smooth, flexible films.

Formulation Strategies

The preparation of guava leaf extract buccal films involves several steps:

1. Extraction of Active Components: Solvent extraction methods, such as ethanol or methanol-based extraction, are used to isolate bioactive compounds from guava leaves.
2. Selection of Polymers: Natural polymers are chosen based on compatibility, mechanical strength, and mucoadhesion.
3. Casting Techniques: The solvent casting method is commonly employed to prepare uniform films.[6]

Mechanism of action:[12]

- Antioxidant activity -neutralizes the free radicals and reduce the oxidative stress



- Anti-inflammatory effect -that reduce the inflammation in gastric tissues
- Cytoprotective role- enhance mucosal barriers integrity

CONCLUSION

The development of antiulcer buccal films incorporating guava leaf extract represents an innovative approach to treating peptic ulcers. Guava leaf extract, rich in bioactive compounds like flavonoids and tannins, offers significant therapeutic benefits, including antioxidant, anti-inflammatory, and antimicrobial properties. By utilizing natural polymers, the formulation achieves enhanced biocompatibility, mucoadhesion, and controlled drug release, making it a patient-friendly alternative to conventional therapies. Buccal films provide a non-invasive, convenient, and effective drug delivery system, bypassing first-pass metabolism and ensuring localized action with minimal systemic side effects. Evaluation studies demonstrate their potential for sustained drug release, mechanical stability, and excellent mucoadhesive properties.

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