

## Formulation and Evaluation of Herbal Tablet for Peptic Ulcer

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### ABSTRACT

Gastric ulcers or the peptic ulcer is the primary complaint that affects the gastrointestinal system. A large extent of the population in the world are suffering from the complaint, and the age group of people those who suffer from ulcers are 20- 55 times. Saucos are known to the mortal beings that are useful in the treatment of conditions, and there are a lot of scientific examinations that prove the pharmacological exertion of herbal medicines. Interpreters have been using the herbal material to treat the ulcers successfully, and the same had been reported scientifically. Multitudinous publications have been made that proves the antiulcer exertion of the shops around the world. The tablets were delved for the antiulcer exertion in two boluses 200 and 400mg/ kg in albino Wistar rats in the artificial ulcer those are convinced by the ethanol. The set tablets showed a better exertion compared to the standard synthetic medicine and the retailed herbal expression. The tablets showed a cure-dependent exertion in ulcer forestallment and treatment. Numerous synthetic medicines are available for the ulcer treatment, and the medicines pose the other problems in the body by showing the side goods and some other responses. This limits the use of synthetic medicines to treat ulcers effectively. Saucos are known to the mortal beings that are useful in the treatment of conditions, and there are a lot of scientific examinations that prove the pharmacological exertion of herbal medicines.

**Keywords** –Herbal Tablet, Peptic Ulcer, Formulation, Herbal Ingredients, Traditional Medicine, Synthetic Medicines, Simultaneously, Mucosal, Muco-adhesive.

### I. INTRODUCTION

Peptic ulcer, also known as PUD (peptic ulcer disease). Peptic ulcer are produced in the stomach and the mucous defense barrier, performing in the damage of mucosal lining of the stomach or duodenum.<sup>1</sup> The two most common types of Peptic ulcer are Duodenal and Gastric ulcers. The phrase refers to the ulceration site. In a single individual, duodenal and stomach ulcers may develop simultaneously. In senior age groups,

stomach ulcers are common and can lead to are referred to as gastric ulcers. Eating may exacerbate discomfort rather than lessen it. Potential side effects include vomiting, nausea, and weight loss.<sup>2</sup> the pathophysiology of peptic ulcer complaint involves an imbalance between defensive factors like acid, pepsin and H. pylori and protective factors like mucin, prostaglandin, bicarbonate, nitric oxide and growth factor.<sup>3</sup> Untreated ulcers, can cause major health issues such internal bleeding, lining perforation in the intestines, and blood emesis and blockage of the stomach exit, stomach ulcers can afflict people at any age.<sup>4</sup> estimated 15,000 people die from peptic ulcer each year in the Indian pharmaceutical market, antacids and antiulcer drugs bring in 6.2 billion rupees and 4.3% of sales.<sup>5</sup> Even in this day and age, 75-80% of people worldwide still receive primary healthcare from herbal medicine, mostly in underdeveloped nations because to its greater cultural tolerance, more bodily compatibility, and fewer negative effects.<sup>6</sup> The disease affects a sizable portion of the globule population, and the age range of persons who have ulcers range in age from 20 to 557. The most common causes of ulcers are medicines and alcohol that decrease prostaglandin synthesis. Apart from this, the majority of ulcers are caused by long –term smoking habits and life style choices. Physiological stress in the body, which produces free radicals, is one of the general other reasons of ulcers. There are several factors underlying the formation of ulcers, most of which have to do with the secretion of stomach acid.<sup>8</sup>

### Peptic ulcer

Peptic ulcer disease (PUD) is an illness that affects a considerable number of people worldwide. It expand when there is an imbalance between the aggressive and defensive factors at the luminal surface of the epithelial cells. Aggressive factors include helicobacter pylori, HCL, pepsins, non-steroidal anti-inflammatory drugs(NSAIDs), bile acid, ischemia, hypoxia, smoking and alcohol. While defensive factors include bicarbonate, mucous layer, mucosal blood flow, PGs and growth factors.<sup>9</sup>

A persistent inflammatory state contain a range of disorders marked by ulceration in the upper gastrointestinal tract regions where parietal cells secrete pepsin and hydrochloric acid. In recent times, there has been rapid advancement in compassionate the pathogenesis of peptic ulcers, with a primary focus on enhanced drug therapies. This progress has probably resulted from the accessibility of proton pump inhibitors, histamine receptor blockers, medications influencing the mucosal barrier, and prostaglandin analogs.<sup>10</sup>

The estimation these medications in clinical settings revealed the emergence of tolerance, relapses, and side effects, casting doubt on their effectiveness. This prompted the exploration of new antiulcer drugs, including herbal alternatives. Indian medicinal plants and their derivatives have proven to be valuable sources of therapeutic agents for addressing diverse disorders, including peptic ulcer disease (PUD).<sup>11</sup>

The objectives in managing peptic ulcer disease encompass alleviating pain, promoting ulcer healing, and preventing recurrence. Presently, no economically efficient treatment fully fulfills these objectives. Therefore, ongoing endeavors focus on identifying a viable treatment from natural product origins. Numerous researchers have assessed a variety of spices and herbs for their anti-ulcer effects in pursuit of a positive outcome.<sup>12</sup>

Several reports suggest that elderly individuals are more liable to gastric ulcers, while younger individuals face a higher risk of duodenal ulcers. Although various drugs like proton pump inhibitors and H<sub>2</sub> receptor antagonists exist for peptic ulcer treatment, their clinical assessment reveals relapses, side effects, and drug interactions. In contrast, the therapeutic applications of plants are considered safe, cost-effective, and efficient due to their easy availability.<sup>13</sup>

## II. MATERIALS AND METHODS

### Materials

Licorice, Guavas leaf, Indian goose berry, Peppermint, Starch, Talc and Magnesium stearate was provided by Runt Institute of Pharmaceutical Sciences and Research Bhilai, Chhattisgarh.

### Equipment:

- Balance for weighing ingredients
- Blender or mortar and pestle for mixing powders
- Granulator (mortar and pestle can be used for small batches)

- Sieve (mesh size depends on desired tablet size)
- Drying tray (shallow pan)
- Oven (Hot Air Oven)
- Tablet punching machine.

### Method

The plant that is used in the preparation of the tablets. That's plant parts were dried for two days. The dried parts were collected and then powdered using a mill and passed through the sieve to achieve a fine powder.

### Process:

- Weigh and blend dry ingredients:** Using your balance, accurately weigh the herbal powder and each excipient according to your recipe. Thoroughly blend the dry ingredients in a blender or with a mortar and pestle to ensure a uniform mixture.



Fig - 1 Mix of Herbs Powder

- Prepare the binder solution:** In a separate container, prepare a binder solution by dissolving the binder (e.g., starch) in a measured amount of granulating liquid (usually water). The amount of liquid will depend on the specific ingredients and desired consistency.



Fig – 2 Starch Solution

- iii. **Granulation:** Here, you can use a granulator for larger batches or a mortar and pestle for smaller ones. Slowly add the binder solution to the dry powder blend while continuously mixing. The goal is to achieve a moist, crumbly consistency that can be easily pressed together.



Fig –3 Mix with starch and herbs

- iv. **Wet massing and Wet sizing:** Once the desired consistency is reached, continue mixing to form a uniform wet mass and Push the wet mass through a sieve with an appropriate mesh size. This breaks up clumps and creates granules of a uniform size suitable for tableting.



Fig – 4 Sieving

- v. **Drying:** Spread the moist granules evenly on a drying tray. You can use an oven set at a low temperature (ideally below 50°C) to expedite drying. Alternatively, air-drying can be done, but it takes longer. The granules are dry when they become free-flowing and brittle.



Fig – 5 Hot Air Oven

- vi. **Milling (optional):**The dried granules are oversized for tableting, use a mortar and pestle or grinder to pulverize them into a finer, more consistent size. Grinding facilitates uniformity, ensuring optimal tablet formation. This process involves reducing the granules' size to a suitable texture for tablet compression.

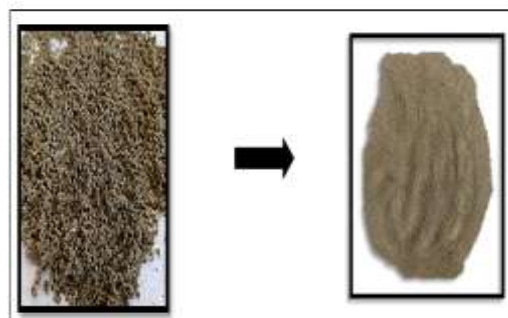


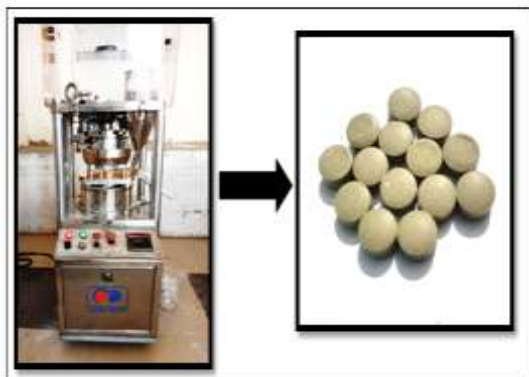
Fig –6 Achieve suitable particle size

- vii. **Lubrication:** Once the granules are dry and sized, add the lubricant (e.g., magnesium stearate) and mix thoroughly. This helps prevent sticking during tableting.



Fig – 7 Lubrication

viii. **Tableting:** Use a tablet press to compress the final mixture into tablets of the desired size and shape.



**Fig – 8 Tableting**

- Shape
- Color
- Odour
- Taste
- Surface texture

**1.2 Physical parameters**

**I. Weight variation test**

- The weight variation test was featured by following procedure.
- Weigh 20 tablets collectively and consider as X1, X2, X3... X20.
- Determine the average weight of 20 tablets  $X = (X1 + X2 + X3 + \dots + X20) / 20$ .
- The particular weight was collated with the upper limit and lower limit.
- No further than two of the tablets differs from the average weight by further than the error listed, and no tablets differ by further than double that chance.

**Formulation table**

S.N.	Ingredient	Quantity taken (g)	Role
1.	Guava leaf powder	10	Antibacterial effects, Anti-inflammatory properties.
2.	Licorice	10	Soothes and Protects, Reduces Acid Secretion.
3.	Indian goose berry	10	Cytoprotective Effects, Antioxidant Activity.
4.	peppermint	5	Cooling agents.
5.	Magnesium stearate	1.4	Lubricant
6.	Talc	4	Diluent
7.	Starch	4.8	Binder



**Fig – 9 Weight of tablet**

**II. Hardness and thickness test**

For each formulation, the hardness and thickness of 20 tablets were demarcated. Hardness test was determined by Monsanto hardness tester and the thickness of tablets was determined by Vernier Calipers.



**Fig – 10 Monsanto & Vernier Calipers**

**EVALUATION OF HERBAL TABLETS**

**1.1 General appearance:**

The general appearance of a tablet, its visual identity and overall "elegance" is essential for consumer acceptance, for control of low-to-lot uniformity.

Appearance of a tablet involved the measurements of a tablet's:-

- Size



### III. Friability test

Frangibility of a tablets can determine in a laboratory by Roche friabilator. The friabilator consists of plastic chamber that rotates at 25rpm, dropping the tablets through a distance of six elevation in the friabilator, which is also operated for 100 revolutions. The tablets are revisited. Squeeze tablets loss lower than 0.5 to 1.0 of the tablet cargo are considered respectable.



Fig – 11 Friability test Apparatus

### IV. Disintegration time

This test was a time required for the tablet to separate into particles, the disintegration test measure only of the time required under a given set of a conditions for a group of tablets to disintegrate into particles. This test was performed to identify the disintegration of tablet in a specific time period.



Fig – 12 Disintegration test Apparatus

## III. RESULTS AND DISCUSSION

Table 1.1 General appearance for herbal tablet

S.N.	Measurements of herbal tablet	F1	F2	F3	
1.	Size	Diameter(cm)	1	1	1
		Width(cm)	0.5	0.5	0.5
2.	Shape	Round	Round	Round	
3.	Colour	Brownish	Brownish	Brownish	
4.	Odour	Odour less	Odour less	Odour less	
5.	Taste	Sweet	Sweet	Sweet	
6.	Surface texture	Smooth	Smooth	Smooth	

Table 1.2 physical parameters for herbal tablet

S.N.	Evaluation Parameters	F1	F2
1.	Weight variation test	0.028	0.084
2.	Hardness test (kg/cm <sup>2</sup> )	4.24	4.00
3.	Thickness test (mm)	0.00633	0.0063
4.	Friability test (%)	0.32	1.66
5.	Disintegration time (min)	7:30	6:50
		7:34	7:00
		7:35	7:15

The formulated herbal tablets containing Licorice, guava leaf, Indian gooseberry, Peppermint were successfully prepared and evaluated. The tablets complied with the standard physicochemical properties, exhibiting acceptable weight uniformity, friability, hardness, and disintegration time. Further in-vitro studies, such as Weight variation test, Hardness test, Thickness test, Friability test and Disintegration demonstrated the potential acid-buffering capacity of the tablets. However, in-vivo studies using animal models with induced peptic ulcers are necessary to assess the actual ulcer-healing efficacy of the formulation. These studies will allow comparison with standard peptic ulcer medications and provide valuable insights into the therapeutic potential of the herbal tablet for peptic ulcer management.

#### IV. CONCLUSION

The formulated herbal tablet containing Licorice, guava leaf, Indian gooseberry, Peppermint was successfully developed and exhibited promising characteristics. The tablets met the required physicochemical properties, ensuring consistent quality and appropriate functionality. In-vitro studies demonstrated the potential of the formulation to neutralize stomach acid and may possess additional ulcer-healing properties depending on the chosen herbal extracts. However, further investigation through in-vivo studies using animal models with peptic ulcers is crucial to definitively assess the tablet's efficacy in promoting ulcer healing. These in-vivo studies will allow comparison with standard peptic ulcer medications and provide a more comprehensive understanding of the therapeutic potential of this herbal tablet as a future management option for peptic ulcers.

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