



IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH  
An official Publication of Human Journals

ISSN 2349-7203



Human Journals

Research Article

October 2020 Vol.:19, Issue:3

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## Formulation and Evaluation of Antacid Suspension of *Limonia acidissima*



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ISSN 2349-7203

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**Submission:** 22 September 2020  
**Accepted:** 28 September 2020  
**Published:** 30 October 2020



HUMAN JOURNALS

[www.ijppr.humanjournals.com](http://www.ijppr.humanjournals.com)

**Keywords:** *Limonia acidissima*, Flavanoids, Antacid activity, Acid neutralizing capacity, Digene

### ABSTRACT

In today's era herbs play a vital role in every industry due to their different properties. In this article, mainly prepare herbal antacid suspension by using an herbal drug-like *Limonia acidissima*. This *Limonia acidissima* contains flavanoid, phenolic compounds, carbohydrates, etc. and it possesses astringent and acid-neutralizing activity that is desirable for the treatment of gastric ulcer. The herbal drug powder collected from fruit pulp and extracted by using the maceration process and it is formulated into suspension by using xanthan gum. The suspension was then evaluated for pH, viscosity, sedimentation volume, dispersibility, antacid and anti-ulcer activity. The evaluation studies showed a pH in the basic range of about 8.3, acid neutralizing capacity for the test suspension (4.4 mEq/ml) is similar to standard suspension (4.8 mEq/ml), high sedimentation volume, and good dispersibility. The formulation containing herbal drug showed similar efficacy with that of standard.

## INTRODUCTION:

Peptic ulcer<sup>[11]</sup> represents a major health problem in terms of morbidity and mortality. Gastric ulcer affects about 60% of the adults and about 80% of the child population in tropical countries. Research advances during the last few years have offered new insight into the therapy and the prevention of gastroduodenal ulceration by measures directed at strengthening the mucosal defense system rather than by attenuating the aggressive acid-pepsin factors held responsible for the induction of ulcers. The success of therapy is measured in terms of ulcer healing, symptom control, etc. Herbal drugs<sup>[34]</sup> are considered to be safe for use, easily available at a cheaper cost, and produce minimal side effects. The herb *Limonia acidissima* is reported in classical Ayurvedic texts<sup>[19]</sup> to possess the astringent and acid-neutralizing capacity that is desirable for the treatment of gastric ulcers. *Limonia acidissima*, which is known as Kaitha, it contains flavonoids<sup>[22]</sup> and phenolic compounds which possess anti-ulcer activity. These properties that have been put forth, for the treatment of gastric ulcers prompted for the preparation of herbal formulation containing *Limonia acidissima*.

## MATERIALS AND METHODS:

### Collection and preparation of fruit material

The fruits of *Limonia acidissima* were collected near the local areas, approximately 4 fruits. After that collected the pulp along with seeds and grind to form a past. And it's dried in a hot air oven at 60<sup>0</sup>Cfor 3 days. After drying the paste is scrapped and triturated finely then sieve the powder and collected very fine particles and the formulation of antacid suspension composition is mentioned in table no:1.

Phytochemical tests are carried out for the pulp powder. They are

- Test for flavonoids
- Test for carbohydrates and glycosides
- Test for phytosterols etc.

**Table No. 1: Formulation of antacid suspension composition:**

S.NO.	INGREDIENT	QUANTITY	CATEGORY
1	<i>Limonia acidissima</i> extract	1g	Anti-ulcer activity
2	Xanthan gum	0.2g	Suspending agent
3	Sorbitol 70% liquid	35ml	Sweetener
4	Methylparaben	0.5g	Preservative
5	Menthol	0.003g	Flavor
6	Distilled water	Quantity sufficient	Vehicle

### **Preparation of the antacid suspension**

In preparation for the antacid suspension formula shown in Table.no.1.

- Weigh the accurate amount of drug and other excipients in the formulation pass through Sieve No.120.
- First, take 40ml of distilled water in a beaker to this 35ml of sorbitol solution was added and mix well.
- To the above solution, xanthum was added and started stirring.
- In another beaker add methylparaben to the drug and mix well.
- Then this mixture is added to the above solution and stirred for 30 min.
- Finally, add menthol flavor and volume made up to 100ml.

### **Evaluation <sup>[45]</sup>:**

- Particle size distribution
- Physicochemical characterization of suspension
  - pH measurement
  - viscosity
  - sedimentation volume

▪ **Stability studies** – Stability studies were carried out on the selected formulations taking gallic acid as the marker compound for 90 days at 30°C/60% RH and 40°C/75% RH. The sample was withdrawn at regular intervals for 30 days for a total period of 90 days. HPTLC studies were performed to ascertain the stability data.

➤ **Acid Neutralizing Capacity<sup>[18]</sup>**

This was performed as per the USP method by taking 5ml of the suspension by using 0.15 M HCl as acid and 0.2 M NaOH as a base record of the final acid and base burette readings.

**The ANC is calculated by using the following formula:**

Moles of acid neutralized = Moles of HCl added – Moles of NaOH required

= (Volume HCl x Molarity HCl) – (Volume NaOH x Molarity NaOH)

Acid Neutralizing capacity per gram of antacid = Moles of HCl neutralized / grams of antacid

**RESULTS AND DISCUSSION:**

The herbal Antacid suspension was formulated by using *Limonia acidissima*. Xanthine gum is used as a suspending agent, sorbitol is used as a sweetener, and methylparaben is used as a preservative.

The prepared pulp powder of *Limonia acidissima* is evaluated by different phytochemical tests and results are mentioned in the following table no:2.

**Table No. 2: Preliminary phytochemical studies of Pulp powder of *Limonia acidissima***

S. No.	Phytochemical constituents	Presence
1.	Flavonoids	+
2.	Carbohydrates	+
3.	Glycosides	+
4.	Triterpenes	-
5.	Fixed oils & Fats	+
6.	Proteins & free Amino acids	+
7.	Phytosterols	+
8.	Alkaloids	+

In the above-mentioned phytochemical studies, there is a presence of flavonoids, carbohydrates, glycosides, alkaloids, phytosterols, etc. and an absence of triterpenes. Due to the presence of flavonoids, the *Limonia acidissima* having an anti-ulcer activity.

- Physicochemical characterization of suspension

Physical characters of prepared formulation:

Colour: Pink

Odour: Odourless

PH: 8.3

From the particle size distribution data, it can be concluded that the suspension is a coarse dispersion with particle size 44.5 micrometers.

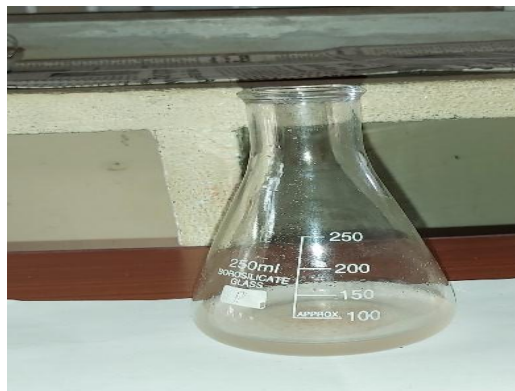
The results of the quality study revealed that the formulation lies within quality parameters as shown in tables. The formulation was found to be heterogeneous with pH value 8.3 which range desired pH the suspension will cause less or no irritation to the GI membrane. The viscosity of the suspension showed good consistency for flocculated suspension and good dispersibility. The fast decrease in sedimentation volume results shown in fig no:4 and the ANC of test and standard results are shown in fig no:1,2,3,4&5.



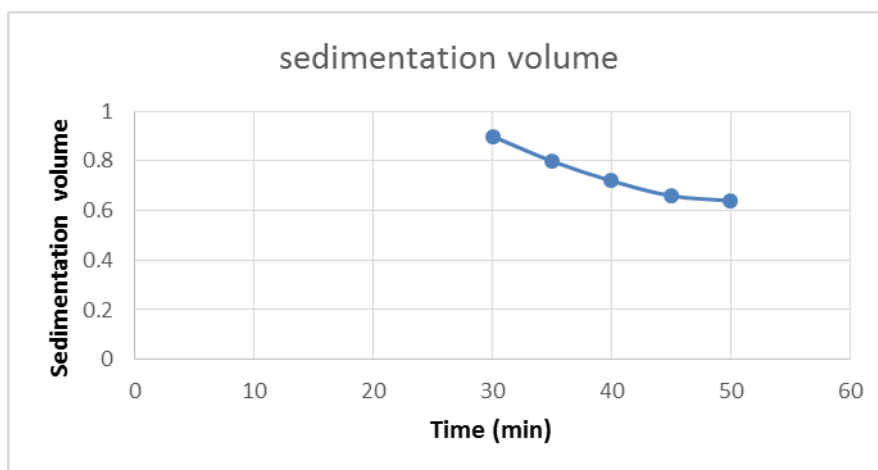
**Figure No. 1: Results of test for ANC of Digene**



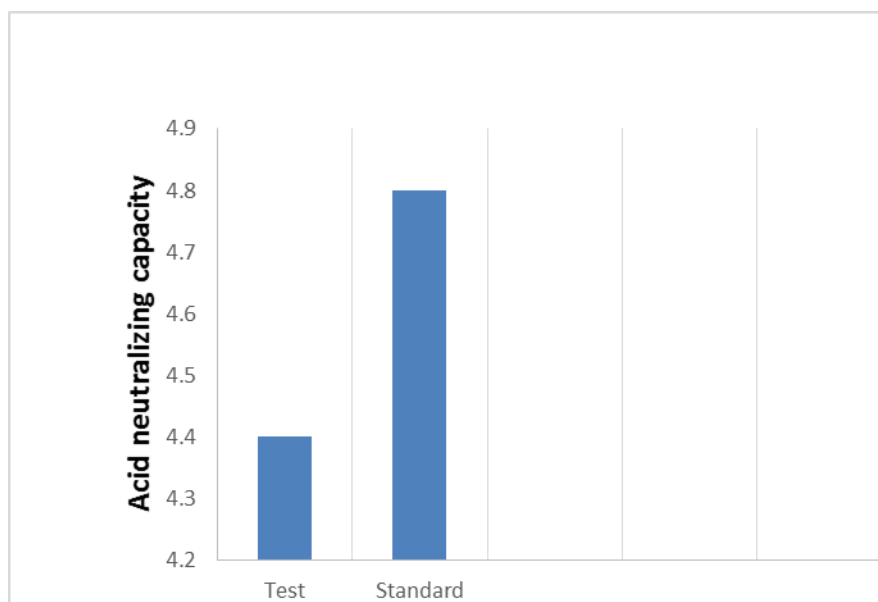
**Figure No. 2: Results of test for ANC of test suspension (HCl added)**



**Figure No. 3: Results of test for ANC of test suspension (NaOH added)**



**Figure No. 4: Graphical representation of sedimentation volume**



**Figure No. 5: Graphical representation of ANC standardization**

The stability study of the formulation was also performed and it was found to be stable and also observe the good suspension. The efficacy of the test suspension was compared with the standard suspension (Digene), both the standard and test suspensions show similar efficacy.

#### **CONCLUSION:**

The therapeutic potential of herbs has been well recognized by various indigenous systems of medicine. Besides their therapeutic use, herbs are disease prevention.

The *Limonia acidissima* powder is used as a suspending agent to prepare a formulation of antacid suspension in various ingredients based on the formulation; the prepared antacid suspension performed various evaluation tests.

Natural remedies are more acceptable in the belief that they are safer with few side effects than the synthetic one's herbal formulation has growing demand in the world market. It is a very good attempt to established the herbal antacid suspension of *Limonia acidissima* this study revealed that the development of herbal formulation was stable and better formulation.

Thus, it can be concluded that such a type of herbal formulation can be incorporated to prepare an herbal antacid suspension.

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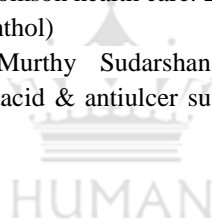
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