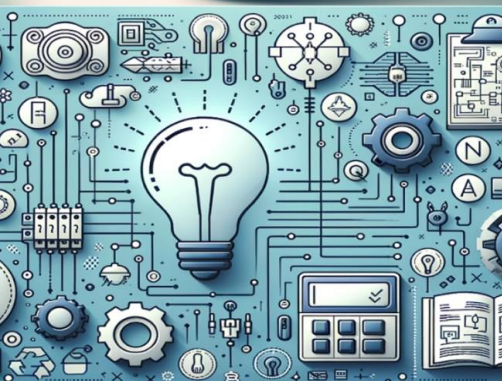


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Formulation & Evaluation of Punica Granatum Extract Syrup for Peptic Ulcer

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ABSTRACT: This study formulated and evaluated a Punica granatum (pomegranate) extract syrup as a potential natural remedy for peptic ulcer management. Peptic ulcers, commonly caused by *Helicobacter pylori* infection and prolonged use of nonsteroidal anti-inflammatory drugs (NSAIDs), result from the weakening of the stomach or duodenal lining. The syrup was prepared using pomegranate extract, raspberry, sucrose, sodium benzoate, and glycerine, and assessed for organoleptic properties, phytochemical content, pH, solubility, viscosity, and stability. All formulations demonstrated stable pH (6.45–6.73), good solubility in water and methanol, consistent viscosity, and favorable sensory characteristics. Phytochemical analysis confirmed the presence of flavonoids, known for their mucosal-protective and antioxidant properties, supporting the syrup's antiulcer potential. Stability studies indicated the syrup maintained its quality under storage conditions, suggesting a good shelf life. The antiulcer activity of Punica granatum is attributed to enhanced mucosal defense, increased antioxidant activity, and reduction of oxidative mucosal damage. In conclusion, the Punica granatum extract syrup is a promising, stable, and palatable formulation for the prevention and management of peptic ulcers.

KEYWORDS: Punica granatum, Chemical components, Peptic Ulcer, Oral Syrup

I. INTRODUCTION

Peptic ulcers are open sores on the inner lining of the stomach and the upper part of the small intestine. The most common symptom of a peptic ulcer is stomach pain. Peptic ulcers include: Gastric ulcers, which appear on the inside of the stomach.

Duodenal ulcers, which appear on the inside of the upper part of the small intestine, called the duodenum. The most common causes of peptic ulcers are infection with the germ *Helicobacter pylori* (*H. pylori*) and long-term use of nonsteroidal anti-inflammatory drugs (NSAIDs). These include ibuprofen (Advil, Motrin IB, others) and naproxen sodium (Aleve).

H. pylori this germ lives in the mucous layer that covers and protects tissues that line swelling and irritation, called inflammation, of the stomach's inner layer. When this happens, it's by close contact, such as kissing. People also can contract *H. pylori* through food and water.

Regular use of certain pain reliever taking aspirin or nonsteroidal anti-inflammatory drugs (NSAIDs) over time can irritate or inflame the lining of the stomach and small intestine. These medicines include ibuprofen (Advil, Motrin IB, others), naproxen sodium (Aleve, Anaprox DS, others), ketoprofen and others. They do not include acetaminophen (Tylenol, others).

Peptic ulcers can result from infection with *Helicobacter pylori* bacteria or from use of medications, such as aspirin or other nonsteroidal anti-inflammatory drugs (NSAIDs), that weaken the lining of the stomach or duodenum. Discomfort caused by ulcers comes and goes and tends to be related to meals.

II. FORMULATION & DEVELOPMENT of PUNICA GRANATUM EXTRACT SYRUP:

Materials:

Punica Granatum, Raspberry, Sucrose, Sodium benzoate, Glycerine

Method :

Preparation of Punica granatum Extract syrup:

First we need to perform water decoction of Punica granatum leaves which are previously powdered. Now for decoction we had taken 20gm of powdered drug and 180ml of water. And placed in water bath until the one fourth of



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the water remain in the beaker. After that we need to make simple syrup of 100ml water by gentle heating and adding 66.67gm of sucrose. The formulation of 30ml of antiulcer syrup we need following quantity of ingredients.

Table1. Formulation of Punica granatum syrup

Material	F1	F2	F3
Punica granatum (Antiulcer activity)	4.16ml	5.10 ml	3.25ml
Raspberry (Flavoring agent)	Qs	Qs	Qs
Sucrose (Natural Preservation)	20.83	25ml	22ml
Sodium benzoate (Preservative)	0.2%	0.3%	0.45%



**Figure:1 Extraction of Punica Granatum
by Decocotion Method**



Figure:2 Extract of Punica Granatum

III. EVALUATION OF PUNICA GRANATUM SYRUP

Organoleptic property:

The prepared syrup will be examined for their appearance, color, odor, and taste.

Flavonoids test:

4.16ml plant extract has been taken in to test tube +2ml of 0.2% sodium benzoate solution has been added in the test tube. The presence of yellow color is the sign that it contains flavonoids.

Measurement of pH:

The pH of the syrup is determined by using digital pH meter. The measurement of pH each formulation is done in triplicate and average values were noted.

Solubility:

To check the solubility of water each formulation was done .

Viscosity:

The viscosity was estimated by following steps of procedure. Use heated chromic acid or an organic solvent like acetone to thoroughly clean the Ostwald viscometer. Set up a vertical setup for the viscometer. Fill the dry viscometer



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with water to the G mark. How long, in seconds, does it take for water to travel from point A to point B Perform step 3 at least three times to ensure a reliable reading. Measure the time it takes for the liquid to flow from mark A to mark B after rinsing the viscometer with the test liquid.

Stability study:

The months of storage at 40 2°C and 75 5% RH are used to evaluate the stability of the final syrup formulation. The samples were analyzed at 0, 7, 14, and 21 days for things like colour, smell, and taste.

IV. RESULT AND DISCUSSION

Preformulation Study:

Organoleptic characteristics: The organoleptic properties of Punica granatum are show in this table no.2

Table2. Organoleptic characteristics of Punica granatum

Characteristics	F1	F2	F3
Appearance	Heterogeneous	Heterogeneous	Heterogeneous
Colour	Pale yellow	Pale yellow	Pale yellow
Odor	Characteristics	Characteristics	Characteristics
Test	Sweet or Bitter	Sweet or Bitter	Sweet or Bitter

Phytochemicals (Flavonoids) test of Punica granatum:

The extracts were determined for their flavonoids content as a crude that is highly potent and effective moiety in the cure of many medical conditions. Extract of punica granatum leaves were shown the presence of flavonoids but aqueous extract demonstrated the absence of flavonoids. The outcome of this test was given in following table.3

Table3. Observation of flavonoids test of Punica granatum

Flavonoids test	<i>Observation:</i> Presence of yellow colour indicates that the presence of flavonoids in the plant extract. Inference: Present	<i>Observation:</i> Presence of yellow colour indicates that the presence of flavonoids in the plant extract. Inference: Present	<i>Observation:</i> Presence of yellow colour indicates that the presence of flavonoids in the plant extract. Inference: Present
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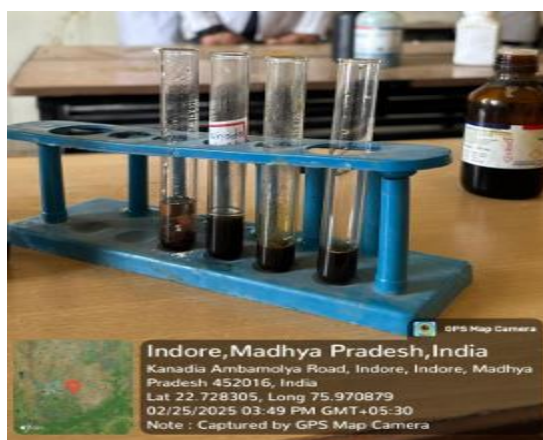


Figure:3 Phytochemicals (Flavonoids) test of Punica granatum

Formulation & Development of Punica Granatum Extract Syrup:

Formulation and development of punica granatum extract syrup was prepared.



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Evaluation of Punica granatum Syrup:

Estimation of pH, Solubility, Viscosity:

The extracts were observed for their pH, solubility and viscosity extract of punica granatum leaves shown the table no.4.

Table4. Estimation of pH, solubility, Density & Viscosity

Characteristics	F1	F2	F3
PH	6.5	6.45	6.73
Solubility	Soluble in methanol and water	Soluble in methanol and water	Soluble in methanol and water
Viscosity	3.64cp	3.62cp	3.66cp

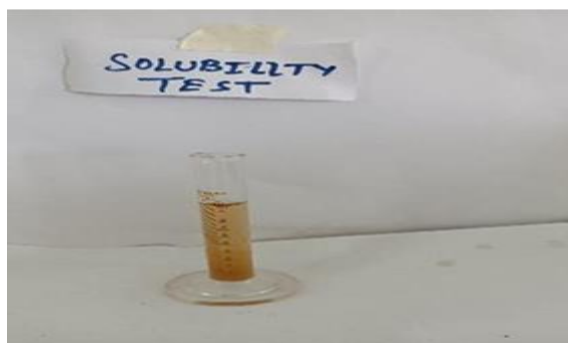


Figure: 4 Solubility test



Figure:5 Viscosity estimation

V. CONCLUSION

The research demonstrated that Punica granatum (pomegranate) extract syrup possesses significant potential as a natural remedy for peptic ulcer management. The syrup, formulated with pomegranate extract, raspberry, sucrose, sodium benzoate, and glycerine, was evaluated for its organoleptic properties, phytochemical content, pH, solubility, viscosity, and stability. All formulations exhibited stable pH (6.45–6.73), good solubility in water and methanol, and consistent viscosity, with favorable sensory characteristics.

Phytochemical analysis confirmed the presence of flavonoids, compounds known for their mucosal-protective and antioxidant properties, which are critical in ulcer prevention and healing. The stability study further indicated that the syrup maintains its quality under storage conditions, suggesting a good shelf life.

The antiulcer activity is attributed to enhanced mucosal defense, increased antioxidant activity, and reduction of oxidative mucosal damage.

In summary, the Punica granatum extract syrup is a promising, stable, and palatable formulation for peptic ulcer prevention and management.

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