



# Preparation And Evaluation Of Pomegranate And Goji Berry Herbal Anti-Ulcer Jellies

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## ABSTRACT

Main constituents such as Goji berries, predominantly from China and pomegranates which have been recognised for their antioxidising activity, are included in the Antiseptic formulation of Jelly F1, F2, F3, F4. The peel of the pomegranate, which contains a high level of tannins, must be macerated for extraction. In the same way, extracts of menthol and goji berries that have been macerated contribute to this formulation. Chemical tests confirm the presence of essential components such as tannins in pomegranate (ferric chloride test), terpenes in menthol (salkowski and sulphur test), and phenolic compounds in Goji berry (lead acetate test). Safety, effectiveness, and multidisciplinary usability are ensured by the evaluation process. Parameters include maintaining a pH range of 6.31-6.75, achieving a successful blue colour in the formulation with no grittiness. The determination of the drug content in the light of absorbance measurement is made by UV analysis. All tests have proved successful in demonstrating that the formulation is ready. In general, the herbal antiulcer jellies have emerged as an elegant solution that harnesses the healing powers of pomegranate, menthol, and Gobi berry to provide potential therapeutic benefits.

**Key words:** Goji-berry, Pomegranate, Anti-Ulcer, Jellies, Antioxidants, Tannins, Terpenes, Health benefits.

## INTRODUCTION

The oral route remains the predominant method of drug administration, valued for its simplicity, safety, and non-invasiveness. Oral jellies, a promising alternative dosage form, offer advantages such as easy administration, safety, and suitability for self-use. These gelatinous formulations, resembling transparent or translucent semisolids, are versatile for both topical and internal application, providing systemic or localized effects. Overcoming the swallowing challenges associated with solid forms, oral jellies are particularly beneficial for populations like children and the elderly who may experience nausea. They swiftly disintegrate, eliminating the need for water and enhancing bioavailability, clinical onset, and solubility. The formulation's water content allows for a local cooling effect, and residual film provides protection upon water evaporation. Key excipients include gelling

agents, stabilizers, preservatives, flavourings, and sweeteners. Gelling agents must ensure minimal residue, taste compatibility, and portability without fragility concerns, while effective taste-masking technologies address bitterness. Importantly, the drug and excipient properties should not compromise orally disintegrating tablet integrity.

**Types of Jelly:** Several types of jellies are as follows:

**1. Medicated jelly:** These types of jellies contain sufficient water which are mostly used on skin and mucous membrane for their spermicidal, local anaesthetics, and antiseptic properties. It gives a local cooling sensation and applied film gives protection after evaporation of water. For example, ephedrine sulphate jelly is used for vasoconstrictor to prevent the bleeding of nose.

**2. Lubricating jelly:** These types of jellies are used for lubrication of diagnostic equipment such as surgical gloves, cystoscopes, catheters, etc.

**3. Miscellaneous jelly:** These are meant for different purposes like- electrocardiography, patch testing, etc.



### Advantages of jelly:

- It can be administered easily, i.e., anytime anywhere as it is easy to handle and does not require water.
- Therapeutic action of drug can be terminated by spitting it before complete ingestion of medicated jelly.
- It serves as an ideal method of drug delivery for dysphagia patients as reduces the risk of aspiration.
- Good mouth feels property of jellies help to change the preparation of medication.
- Rapid onset of action.

### Disadvantage of jelly:

- Challenges in dose calculation.
- After oral administration, it should leave little to no tongue residue that is compatible with pleasant mouth feel.

- As it is aqueous based preparation it needs to appropriate packaging to maintain stability of drug in various environment.

## PLANT PROFILE

### 1. *Punica Granatum* L (Pomegranate)

The pomegranate (*Punica granatum* L.), a shrub or small tree with several stems that grows to a height of 16 to 26 feet, is native to Northern Africa and the Caucasus. It is a member of the Lythraceae family and has red blooms with three to seven petals, long-lasting branches, and leaves that are two centimetres broad. The fruit has a berry-like appearance, is covered in a leathery peel, and has between 200 and 1400 seeds packed inside juicy arils. Combining the Latin words "**pomum**" for seeds and "**granatus**" meaning full of, the term "pomegranate" was born. Diverse sections of the tree contribute to the 153 recognised substances that make up its rich supply of phytochemicals, especially polyphenols; flavonoids and tannins being the most common types.



#### Taxonomy:

<b>Kingdom</b>	<i>Plantae</i> - Plants
<b>Subkingdom</b>	<i>Tracheobionta</i> - Vascular plants
<b>Superdivision</b>	<i>Spermatophyta</i> - Seed plants
<b>Division</b>	<i>Magnoliophyta</i> - Flowering plants
<b>Class</b>	<i>Magnoliopsida</i> - Dicotyledons
<b>Subclass</b>	<i>Rosidae</i>
<b>Order</b>	<i>Myrtales</i>
<b>Family</b>	<i>Punicaceae</i> Bercht. & J. Presl - Pomegranate family
<b>Genus</b>	<i>Punica</i> L. - pomegranate
<b>Species</b>	<i>Punica granatum</i> L. - pomegranate

#### Cultivation:

Pomegranates grow best in regular, well-drained soil; they also do well in rocky gravel and calcareous or acidic loam. They can withstand drought and grow in Mediterranean regions with summer rainfall as well as winter rainfall. They are generally propagated from 25 to 50 cm hardwood cuttings to ensure consistency, and they are easily cultivated from seed. Pomegranates are ideally suited for semisolid moderate temperate to subtropical temperatures.

#### Chemical Constituents:

Different parts of pomegranate fruits, such as seeds, skins, and arils, have different medicinal properties that influence biological activity and help maintain health. About 60% of the fruit is made up of peels, which are rich in proanthocyanidin compounds, ellagitannins, flavonoids, and important minerals including potassium, salt, calcium, magnesium, and phosphorus. The peel of pomegranates contains about 30% of the fruit's anthocyanins, and the fruit itself contains 0.2% to 1.0% flavonoids. Flavones such as genistein and diadzein are found in seeds in addition to estrone. Alkaloids such as isopelletierine, pseudopelletierine, and N-methylisopelletierine, as well as anthocyanidins, ellagotannins, gallic acid, and ellagic acid, are found in the stems and roots.

### Uses:

- Pomegranates have long been used in alternative medicine to treat conditions like urinary tract infections and sore throats.
- According to recent study, they may be able to treat diseases like diabetes, osteoarthritis, skin cancer, and prostate cancer.
- The fruit was regarded as a good crop and represented fertility in the past.
- Pomegranate juice was recommended by Greek physicians for several conditions, such as digestive problems and inflammation.
- Antioxidant qualities are exhibited by pomegranate extracts, which reduce oxidative stress, scavenge free radicals, and increase antioxidant capacity in older people and animals.

## 2. Goji Berries (*Lycium barbarum*):



Goji, also known as goji berry or wolfberry, refers to the sweet fruit of either *Lycium barbarum* or *Lycium Chinese*, closely related boxthorn species in the nightshade family, Solanaceae. Distinguishing between *L. barbarum* and *L. Chinese* involves variations in taste and sugar content. This fruit has been integral to traditional Chinese, Korean, and Japanese practices since the 3rd century AD, termed *lycii fructus* in pharmacopeias. From the early 2000s, goji berries gained popularity in developed nations as health foods or alternative medicine remedies, accompanied by unsubstantiated health claims. The main variety, *L. barbarum*, presents a vibrant orange-red ellipsoid berry, 1–2 cm in diameter, with a split calyx and variable seed count (10 to 60 seeds), each about 2 mm long and yellowish.

### Chemical Constituents:

Goji berries are rich in bioactive compounds known for their potent antioxidant properties. Polysaccharides stand out as a crucial group among these compounds. Phenolic compounds, such as phenolic acids and flavonoids, are also abundant in goji berries. Notable examples of phenolic compounds found in these berries include caffeic acid, caffeoylquinic acid, chlorogenic acid, and rutin, all possessing exceptional antioxidant capacity.

### Uses:

- Goji berries, small red fruits, are rich in antioxidants and possess potent medicinal properties.
- **Support weight loss:** Nutrient-packed goji berries have a low glycaemic index, curbing sugar cravings and aiding in weight loss.
- **Abundant antioxidants and nutrients:** Goji berries serve as an exceptional source of antioxidants, enhancing the immune system and shielding the body from inflammation.
- **Maintain skin and eye health:** Beta-carotene and other phytonutrients in goji berries contribute to the protection of skin and eyes.
- **Regulate cholesterol levels:** Goji berries help maintain an ideal balance of triglycerides, potentially preventing heart diseases.

### 3. Mentha Piperita ( Peppermint)

*Mentha piperita* L., a sterile hybrid of *Mentha aquatica* L. and *Mentha spicata*, is an important aromatic herb grown worldwide that is mainly grown for oil distillation. Peppermint is an essential herb in commercial herb cultivation, with its distinctive sweetish leaves that release a strong aroma and a warm, pungent taste that is followed by a cooling aftertaste. Its transformative origins are reflected in the genus name *Mentha*, which comes from the Greek mythology nymph *Mintha*; its peppery taste is suggested by the Latin *piper*, *piperita*. Among the varieties are *officinalis* Sole, *sylvestris* Sole (Hungarian mint), and *vulgaris* Sole (Mitcham mint). Two cultivars of mint are black mint, which has violet leaves, and white mint, which has pure green leaves.

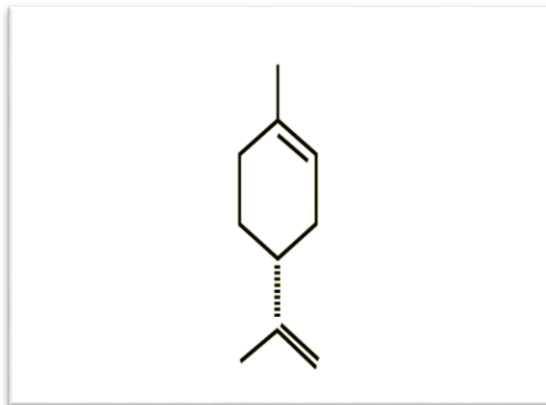


#### Taxonomy:

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Lamiales
Family	Lamiaceae
Genus	<i>Mentha</i>

#### Chemical Constituents:

The essential oil of peppermint contains a significant amount of menthol along with menthone and carboxyl esters, specifically menthyl acetate. Usually containing menthol (7–48%), menthone (20–46%), menthyl acetate (3–10%), menthofuran (1–17%), and 1,8-cineol (3–6%), dried peppermint contains 0.3–0.4% volatile oil. Furthermore, peppermint oil contains traces of caryophyllene, pinene, limonene, and pulegone. Packed with terpenoids and flavonoids, such as hesperidin, kaempferol 7-O-rutinoside, and eriocitrin, peppermint provides a wide range of chemical constituents.



#### Uses:

- Peppermint oil provides relief from several ailments.
- It relaxes the muscles in the stomach, improving the flow of bile and helping with indigestion—but not for people who have gastroesophageal reflux disease (GERD).
- Distilled peppermint oil eases redness and irritation associated with skin conditions.

- When used on the forehead, it works well to relieve tension headaches.
- Studies on peppermint during pregnancy have yielded conflicting results regarding its ability to reduce nausea.
- It also relieves cancer patients' vomiting brought on by chemotherapy.
- To highlight peppermint's adaptable but cautious use across a variety of health concerns, always dilute before skin application and avoid peppermint in GERD cases.

## MATERIALS AND METHODS

**Materials used:** Goji Berry extract, Pomegranate extract, Mentha extract, Corn starch, Gelatin, Methyl Paraben, Ethanol (90%).

### Equipment used:

Weighing balance, pH meter, UV Spectrophotometer.

**Glassware used:** Conical flask, Glass rod, Spatula, Beaker, Butter paper, Funnel, water bath, pipette, rubber bulb, moulds.

### Preparation of Pomegranate extract:

- Fresh Pomegranate fruits were procured from the market.
- The peels of fruits were delicately separated and cut into the small pieces.
- Then small peels were allowed to stand in ethanol solution for 7 days.
- After 7 days, the extract was filtered into the iodine flask and the presence of required components was tested.



### Preparation of Goji berry extract:

- Fresh dried goji berry fruits were ordered from the market.
- Then the fruits were put into the ethanol solution and allow to stand for 7 days.
- After 7 days, the extract was filtered into the iodine flask and the presence of required components were tested.

### Preparation of Mentha extract:

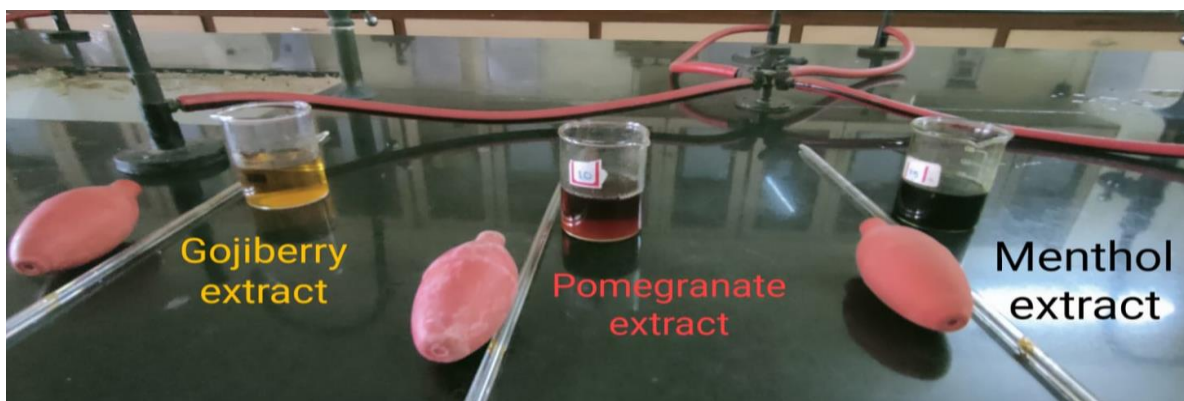
- Fresh Mentha leaves were procured from the market, then conscientiously washed and dried.
- The leaves were delicately separated and only the intact leaves were selected.
- Then the leaves were allowed to stand in ethanol solution for 7 days.
- After 7 days, the extract was filtered into the iodine flask and the presence of required components were tested.



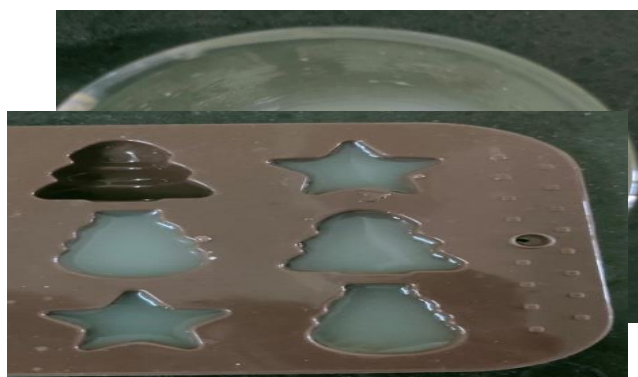
### Formulation of the jellies:

#### Procedure:

1. All the extracts were prepared by making their tinctures.
2. Corn starch and gelatin were put into the distilled water in beaker and heated into the water bath to form a jelly base.
3. After the efficient mixing of the base, the drug extracts were mixed into the beaker along with the food colour.



4. After 5 mins of constant stirring the jelly like consistency was about to be obtained.



5. The solution was no longer heated, and the resulting hot mixture was poured into moulds, left to cool.

6. After cooling, the jellies are removed from the moulds and it is prepared.



#### Formula:

Sr no.	Ingredients	F1	F2	F3	F4
1	Goji berry extract	0.5 ml	1 ml	0.5 ml	0.5 ml
2	Pomegranate extract	0.6 ml	0.5 ml	0.8 ml	0.5 ml
3	Mentha extract	0.7 ml	0.5 ml	0.5 ml	1 ml
4	Corn starch + gelatin	2 mg	2 mg	2 mg	2 mg
5	Stevia powder	1 mg	0.8 mg	1 mg	0.8 mg
6	Methyl Paraben	0.2 mg	0.2 mg	0.2 mg	0.2 mg
7	Distilled water	Q.s	Q.s	Q.s	Q.s

Out all these formulations F1 was the optimised formulation.

### PHYSIOCHEMICAL EVALUATIONS

**1. Physical evaluation:** Physical parameters such as colour, stickiness and grittiness were checked for prepared formulation.

- **Colour-** The formulation's colour is bright blue.
- **Stickiness-** It is appropriately sticky as per the requirement of a jelly.
- **Grittiness-** It is not gritty.



**2. pH Determination:** Using a pH metre (Kedida), the preparation's pH is determined. To ensure that the instrument displays pH values accurately, it must be calibrated using two buffer solutions: one acidic (phosphate buffer, pH 5.01), and the other pH-neutral (pH 7.01). The pH of the essence is then displayed on the display after the electrode has been rinsed in the essence.

Formulation	pH value
F1	6.31
F2	6.32
F3	6.45
F4	6.75



**3. Chemical test:** The active ingredients in the formulation are pomegranate, menthol, and goji berry extract. The pomegranate extract contains tannins, the menthol extract contains terpenoids, and the goji berry extract contains phenolic compounds. Certain chemical tests are carried out to verify the existence of these active ingredients.

➤ **Pomegranate:**

Preliminary test for presence of tannins in Pomegranate extract

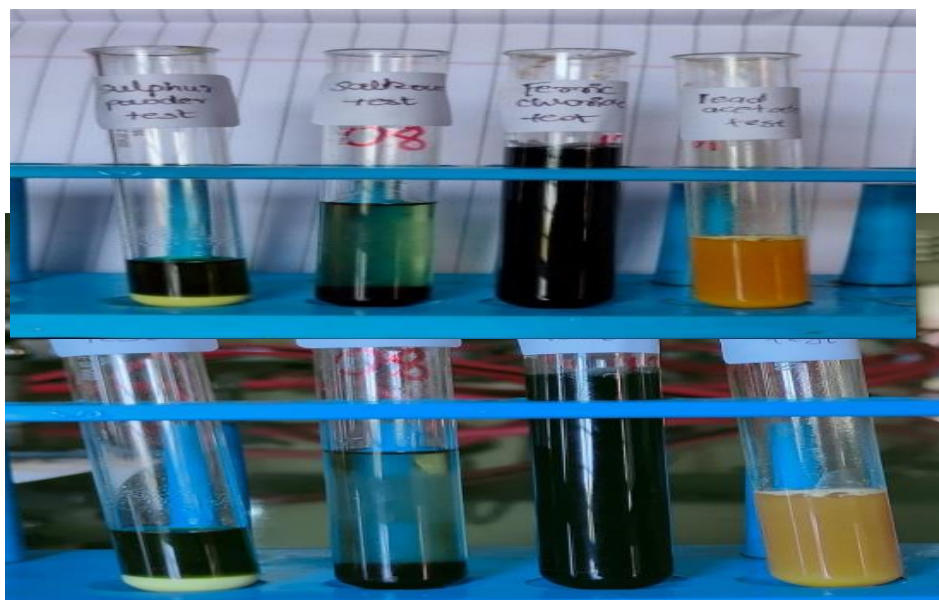
This includes a ferric chloride test, in which 5 ml of pomegranate extract + 5 ml of distilled water along with 3-4 drops of  $\text{FeCl}_3$  reagent. It results in the presence of tannins by forming a blue colour as shown in a test tube.

Test	Observation	Inference
<b>Ferric chloride test-</b> 5 ml extract + 5 ml distilled water+3 drops $\text{FeCl}_3$	Blue colour	Tannins present
<b>Lead acetate test-</b> extract +0.5 ml of 1% lead acetate	Ppt formation	Tannins present

➤ **Menthol:**

Preliminary test for presence of terpenes in Menthol extract.

Test	Observation	Inference
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<b>Salkowski test-</b> 5ml extract+2ml chloroform+ 3 to 4 drops of sulphuric acid	Reddish brown color	Terpenes present
<b>Sulphur powder test-</b> small amount of Sulphur powder and extract solution	Sulphur powder sink	Terpenes present

➤ **Goji Berry:**

This includes a Lead acetate test, in which 2 ml of goji berry extract is mixed with 0.5 ml of lead acetate reagent resulting in the appearance of an orange colour in the test tube indicating the presence of phenolic compound.



**4. Spreadability test:** Excess sample was placed between the two glass slides and xg weight was placed on the glass slide for min to compress the sample to a uniform thickness. The Spreadability is 21 mg.cm/s.

**5. Drug content Uniformity:** Drug content uniformity is a critical quality attribute in pharmaceutical manufacturing, ensuring that each dosage unit of a drug product contains the intended amount of the active pharmaceutical ingredient (API) in a consistent and uniform manner. The drug content is determined by UV analysis by measuring its absorbance as shown in the below table.

The following absorbance for drug content was taken at 254 nm.

## CONCLUSION

According to the study's findings, antiulcer compounds found in herbal substances are used in traditional medicine to treat peptic ulcers caused by *Helicobacter pylori* (*H. pylori*). These compounds have the potential to be used as effective antiulcer agents in new medications without causing gastrointestinal distress or acidity. Every formulation has rejuvenating qualities and good bioavailability. The prepared formulation exhibits no irritation when taken orally, indicating that it is a safe option.

## DISCUSSION

The ingredient containing the active constituent passes the chemical test in the evaluation studies conducted chemical testing. A few of the formulation's physicochemical characteristics, including colour, stickiness, grittiness, and pH, were also investigated. Every formulation has a pH that is within the ideal range. Furthermore, fifteen minutes after application, none of the formulations cause any noticeable oral irritation.

Excellent dissolving qualities of the Antiulcer jellies result in significant bioavailability and a beneficial therapeutic effect. Antiulcer jellies have been developed as a result.

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Drug Content	Absorbance
1 ml	3.267
1.5 ml	3.520
2 ml	3.818

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