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Formulation and Evaluation of Syrup Using Papaya Leaf Liquid Extraction for Treatment of Thrombocytopenia Disease

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Pharmacuetical research
Pharmaceutical Development of Papaya Leaf Syrup fo

ABSTRACT

Thrombocytopenia is a clinical manifestation that refers the platelet count I.e., <150 10/UL, of Blood, resulting in imbalanced hemostasis which leads to several fatal complications. The causative factors very great, but as a consequence, they interfere with platelet production and promote destruction, leading to death. Carica Papaya leaf has unique therapeutic and medicinal characteristics against thrombocytopenia, and this is supported by scientific studies. Secondary metabolites and minerals in the leaf, such as carpaine and queroetin, promote platelet production, inhibit platelet distruction and maintain platelet membrane through gene expression activity and the oesing of viral professes respectively. This review explores the scientific studies the support the role of papaya leaf in the form juice, liquid extract of syrup, extract of powder against thrombocytopenia through animal modeling and clinical trials. Phytochemicals profiles of C.Papaya leaf revealed the presence of flavonoids, alkaloids, phenols, cardiac glycosides, tannins, terpines, and saponins, which impact therapeutic potential to the leaf. The therapeutic benefits of the leaf The therapeutic benefits of the leaf include immunomodulatory, antiviral, antidibetic, anticancer, antimalarial, antiglogenic, antibacterial, and antioxidant activities, several conducted scientific research studies have proved the efficacy of C. papaya leaf against thrombocytopenia, expanding the implication of natural sources to eradicate numerous aliments.

Keywords: - thrombocytopenia, carica papaya leaf, phytochemicals, gene expression activity, therapeutic potential

1. INTRODUCTION

1.1Platelets:

1.1.1 History Platelets.

Clinically known as Thrombocytes, are small components of blood produced in the bone marrow with a key role in blood clotting. The major function of thrombocytes is to stop bleeding from injured blood vessels. These anucleated cell fragments in mammals are called as platelets (Hawkey, 2013). These non-mammalian vertebrate thrombocytes differ from the mammalian platelets in the presence of nucleus and they do not aggregate in response to add, serotonin and adrenaline. Platelets were first observed by Leeuwenhoek at the Royal society of London (van Leeuwenhoek, 1674). Through Hew son (1771) had fully describe Platelets them for the first time in 1780. He had Describe them as minute, Undefined particles in blood Alfred done, a histologist from France, Later named them in 1842 as "piasthan", was the first one to clearly established the significance of these particles the were visible not only in blood extracted from veins, but also in Schultz (1865). He described them as clumps of irregular shape structure with different sizes ranging up to 80 micrometer and filled with small 1-2 micrometer and globules or colorless granules.

1.2Structure of Platelets:
Blood is a Complex liquid tissue containing broadly three different types of erythrocytes, corpuscles viz.leucocytes and Platelets. Unlike red and white blood cells, platelets are not actually cells but rather small fragments cells nearly ¼ size of RBC.

1.3Platelet Disorders: General Introduction Platelet disorder can be divided into Qualitative and Quantitative disorders.

1.3.1 Qualitative Platelets Disorders: Qualitative Platelet disorder is suggested by a prolonged bleeding time (abnormal platelet function screen) or clinical evidence of bleeding in the setting of a normal platelet count and coagulation studies. They are usually acquired, but can be inherited. A new Platelet function test, PFA-100 (Dade-Behring, Deerfield, III), has a 96% sensitivity for detecting platelet disorder like von will brand disease and aspirin- induced Platelets defects (Mammen et al., 1998). It has yet to find a place among routine coagulation laboratory tests.

I. Drug –Induces Platelet Dysfunction
The most common drug responsible for this dysfunction is aspirin, which irreversibly inhibits cyclooxygenase and blocks the formulation of thromboxane A2 (Loll et., 1995). Other Common drugs include clopidogrel, ticlopidine, and glycoprotein IIb/IIIa inhibitors. Non-steroidal anti-inflammatory drugs (NSAIDS), unlike aspirin, bind reversibly at the active site of the enzyme. This binding usually depressed platelet thromboxane formation to the degree that platelet function is impaired for only a portion of the dosing interval (Pedersen & FitzGerald, 1985).

ii. Uremia Platelet dysfunction

"Uremia thrombocytopathy" in renal failure, is attributable to high levels of small, partly dialyzable molecules known as uremia toxin (boccardo et al., General Introduction 2004). This imparts a Predicts position to bleeding that is incompletely understood. Treatment involves correction of anemia, hemodialysis, and the use of decompressing. Platelet transfusion does not correct the coagulopathy because the transfused platelets will assume him dysfunction of the uremic platelets (Wager & Schafer, 1998).

iii. Liver Disease

Whether acute or chronic, hepatic disease is associated with platelet dysfunction that is multifactor in origin as liver synthesizes Thrombopoetin and various clotting factors. Increased fibrin Degradation Product FDP) levels from activation of the fibrinolysis pathway compromise platelet function and impaired released factor III from platelet because of cirrhosis or manifestation of hepatic dysfunction (AI Ghumias & AbdelGader, 2003, Wilson et AL., 1968).

IV. Acquired von Wile brand Disease

Acquired von Wile brand disease (vWD) is often described in patient with autoimmune disorders, lymph proliferative disorders, or monoclonal gammopathies. It may also be induced (e.g., by vWF degradation by proteolytic enzymes.

1.3.2 Qualitative Platelet Disorders

General Introduction

Thrombocytosis is defined as a condition where the Platelet count goes above the upper limit of the normal range (450x109/L in adult) (Skoda, 2009).

There are mainly two types of thrombocytosis. Hematological disease including primary thrombocytosis Primary thrombocytosis is an also referred to as essential thrombocytosis, essential thrombocythaemia and primary thrombocythaemia. It is caused due to myeloproliferative disorder in which there is failure to regulate the production of platelets (autonomous production). The clinical features include a platelet count greater than 600 x hemorrhage. In these, Platelet survival is normal but function is not. Other hematological diseases which cause thrombocytosis are myeloproliferative, myelodysplastic or a combination of both. It includes some leukemia too. Secondary or reactive thrombocytosis Platelet count is found to increase in response to various stimuli, including systemic infection, inflammatory conditions, bleeding and tumors, as they are acute-phase reactants (Mantadakis et AL., 2008; Vora & Lileyman, 1993). This exaggerated physiological response to a primary problem such as infection, is called reactive or secondary thrombocytosis, which is a benign form of thrombocytosis. In case, the increase in platelet production is caused by the trigger factor (e.g., infection) include 8 General Introduction released of cytokines (Araneda et al., 2001; Tefferi et al., 1994).

Mechanism of Thrombocytopenia:-

Thrombocytopenia (low platelet count) can arise through several mechanisms, often grouped into three main categories:

1. Decreased Platelet Production

Occurs when the bone marrow fails to produce enough Platelets. Causes include:

- Bone marrow disorder: Aplastic anemia, leukemia, myelodysplastic syndromes
- Infection: HIV, hepatitis C, EBV
- Drugs: Chemotherapy, alcohol, Radiation
- Nutritional deficiencies: Vitamin B12, folate

2. Increased Platelet Destruction

The body destroys Platelets faster than they produced. Mechanisms include:

- **Immune-mediated:**
- Idiopathic thrombocytopenic purpura (ITP)
- Drug- induced thrombocytopenia

  (e.g., heparin-induced Thrombocytopenia-HIT)
- Autoimmune diseases (e.g., lupus)

Non-immune:

- **Disseminated intravascular Coagulation (DIC)**
- **Thrombotic microangiopathies** (e.g., TTP, HUS)

- **Mechanical destruction** (e.g., Prosthetic heart valves)

3. Sequestration of Platelets

- Platelets can be sequestered in an enlarged spleen (hypersplenism), reducing circulating platelet numbers.

4. Dilutional Thrombocytopenia

- Can occur after massive transfusion or fluid resuscitation, diluting the platelet concentration.

Would you like this summarized in a table or a flowchart for easier study?

Factors responsible for Thrombocytopenia

1. Decrease Platelet Production

- **Bone marrow failure:**

1. Aplastic anemia
2. Myelodysplastic syndromes

- **Bone marrow infiltration:**

1. Leukemia
2. Lymphoma
3. Metastatic cancer

- **Nutritional deficiencies:**

1. Vitamin B12 deficiencies
2. Folate deficiency

- **Infections:**

1. HIV
2. Hepatitis Bor C

- **Drug and toxins:**

1. Chemotherapy
2. Alcohol
3. Radiation therapy

2. Increased Platelet Destruction

- **Immune-mediated:**

1. **Immune thrombocytopenia purpura (ITP)**
2. Systemic lupus erythematous (SLE)
3. Drug-induced (e.g., heparin-induced thrombocytopenia, quinidine, sulfa drugs)

- **Non-immune-mediated:**

1. Thrombotic thrombocytopenic purpura (TTP)
2. Hemolytic uremic syndrome (HUS)
3. Disseminated intravascular coagulation (DIC)
4. Sepsis

3. Platelet Sequestration

- **Hypersplenism:**

1. Cirrhosis
2. Portal hypertension Splenic tumors or cysts

4. Dilution Causes

- **Massive transfusion**
- **Cardiopulmonary**

5. Congenital Disorders

- Wiskott-Aldrich syndrome
- Bernard-soulier syndrome
- May- Haggling anomaly

2. Treatment of Thrombocytopenia

1. Identify and Treat the Underlying cause

- **Infections** (e.g., dengue, HIV, hepatitis): Treat the infection.
- **Drug induced** (e.g., heparin, quinine, chemotherapy): Discontinue the causative drug.
- **Bone marrow disorders** (e.g., leukemia, aplastic anemia): Treat the underlying hematologic disease.
- **Autoimmune conditions** (e.g., ITP, lupus): Immunosuppressive therapy may be required.

2. Supportive Treatment

- **Platelet transfusions**: Given if platelet count is critically low (10,000/uL) or there is an active bleeding.
- **Avoidance of antiplatelet drugs/ NSAIDs**: To reduce bleeding risk.

3. Specific Therapies

Immune Thrombocytopenic purpura (ITP)

- First-line

1. Corticosteroids (e.g. Prednisone, dexamethasone)
2. IVIG (Intravenous Immunoglobulin)

- Second-line

1. Rituximab
2. Thrombopoietin receptor agonists
   (e.g., eltrombopag, romiplostim)
3. Splenectomy (in chronic or refractory cases)

Thrombotic Thrombocytopenic purpura (TTP)

- Plasma exange (plasmapheresis)
- Steroids
- Rituximab (in refractory cases)

Heparin-induced Thrombocytopenia (HIT)

- Stop all heparin
- Start alternative anticoagulation (e.g., argatroban, fondaparinux)
- Avoid platelet transfusion unless there is bleeding

d. Bone Marrow Failure Syndromes

- **Aplastic anemia:** Immunosuppressive Therapy or bone marrow transplant
- **Myelodysplastic syndromes:** Supportive care, disease-specific therapy

4. Supportive Treatment

- **Platelet transfusion**: For severe thrombocytopenia (<10,000uL)
- Avoid medications that affect platelet (e.g.,NSAIDs, aspirin)
- Avoid activities that increase bleeding risk

Benefit of Thrombocytopenia

Thrombocytopenia is a generally a pathological condition, not considered beneficial. However in rare and specific contexts, a low platelet count might have certain theoretical or incidental benefits, although these do not outweigh the risks. Here are a few nuanced points:

1. Reduced Risk of Thrombosis

- In some cases, mild thrombocytopenia may lower the risk of blood clots (thrombosis), especially in patient at high risks for clotting disorder.
- For example, in heparin-induced thrombocytopenia (HIT) or essential thrombocythemia, reducing platelets can help reduce thrombotic complications.

2. Controlled Platelet Levels in Myeloproliferative Disorders

- In diseases like polycythemia Vera or essential thrombocythemia, where platelet counts are abnormally high, treatment may intentionally lower platelet (causing relative thrombocytopenia) to reduce clotting risk**.**

3. Indicator of Disease or Toxic Exposure

- Thrombocytopenia can be useful clinical sign that alerts doctors to serious conditions (e.g., sepsis, leukemia, DIC) or drug toxicity early on, promoting timely treatment.

Important Note:

Despite these rare contexts, thrombocytopenia is usually harmful, leading to increased bleeding risk, especially if Platelets drop below 50,000/ uL or there is active bleeding.

Drawback of papaya leaf extraction syrup

- **Quality Control Challenges**

1. Variability in Papaya leaf Quality:

Difference in papaya leaf quality, sourcing, and processing can affect the final products efficacy and safety.

2. Standardization difficulties:

Standardization the extracts bioactive compounds can be challenging, leading to inconsistent products.

- **Stability and healf-life concerns**

1. Degradation of bioactive compounds:
Papaya leaf extracts can degrade over time, affecting the products potency and efficacy.

2. Microbial Contamination:
Liquid extracts can be susceptible to compromising the products safety.

- **Regulatory Consideration:**

1. Regulatory compliance: Papaya leaf liquid extraction syrups may be subject to regulatory requirements, such as labeling and testing standards

3. Literature reviews

1. S Munir, ZW Liu, T Tariq, R Rabail, PL Kowalczewski… - Molecules, 2022 – mdpi.com 2022 prevention are also evaluated in this review. Therefore …Papaya leaves are used as traditional medicine. In an open … formulated for children above 12 years and syrup at 10 mL.

2. JM Thadani – 2018 Papaya leaves have been used in folk medicine for centuries. … Study to evaluate the efficacy and safety of carica papaya … in Malaysia use carica papaya leaf formulation in palm oil.

3. RW Wiggins, J Woo, JN Cauba, S Mito – Applied Biosciences, 2024 … Table 1 shows the effects of carica papaya leaf extract (… the treatment group received 5 mL of ThromboBliss syrup syrup(…) leaf extract are attributed to its rich biochemical composition,…

4. D Yudisthira, FF Firdausi, CF Alyani, F Nurkolis… - … in Traditional Medicine, 2024 – Springer …and the assessment of the quality of the literature is based on the … using syrup preparations, while one study did not explain C. … Preparation of papaya preparations by drying the papaya…

5. KP Mishra, J Bakshi, G Sharma, S Singh… - Indian Journal of Clinical …, 2023 – springer … regulating various processes like clot formation, hemostasis, and … evaluate alternative strategies to treat thrombocytopenia. A … hemorrhagic fever receiving car pill syrup thrice a day for 5…

6. P Goyal – 2022 – krishikosh.egranth.ac.in … Filtration of liquid extract plate 8: … evaluated for the treatment of bone – marrow suppression along with decrease in blood cells caused by certain drugs. One newer therapeutic agent.

4. AIM AND OBJECTIVE

AIM: Formulation And Evaluation Syrup By Using Papaya Leaf Liquid Extraction For The Treatment Of Thrombocytopenia

OBJECTIVE:

1. Extraction of papaya leafs
2. To Enhance the solubility of poorly water soluble drug
3. To formulate a stable oral syrup
4. To assess the Phytochemical profile
5. To ensure microbial and chemical stability
6. To evaluate the safety profile
7. To compare the efficacy of formulated syrup

PLANE OF WORK

1. Literature review

Identify key compound in papaya leaf that are revelent to WBC normalized Activity

2. Leaf collection and preparation

3. Extraction process by soxlet extraction

4. Formulation of Papaya leaf Extraction Syrup

5. Evaluation test

6. Result & conclusion

Plant Profile

PAPAYA LEAF

Fig. 1 Papaya Leaf

Synonyms	Papaya Leaf, Pawpaw,Papita,Pappali,Omakka
Botanical Name	Caica Papaya L.
Family	Caricaceae
Phytochemical Constituents	• Phenolic acids (Gallic acid, affeic acid, Chlorogenic acid, Ferulic acid, p-Coumaric acid) • Alkaloids (e.g., Carpaine)
Uses	• Platelets increased • Dengue Fever • Anti-malarial • Skin disorder • Digestive Aid • Anti-inflammatory • Anticancer Potential • Liver Health • Skin Disorder

Table no.1 Monograph of Papaya Leaf

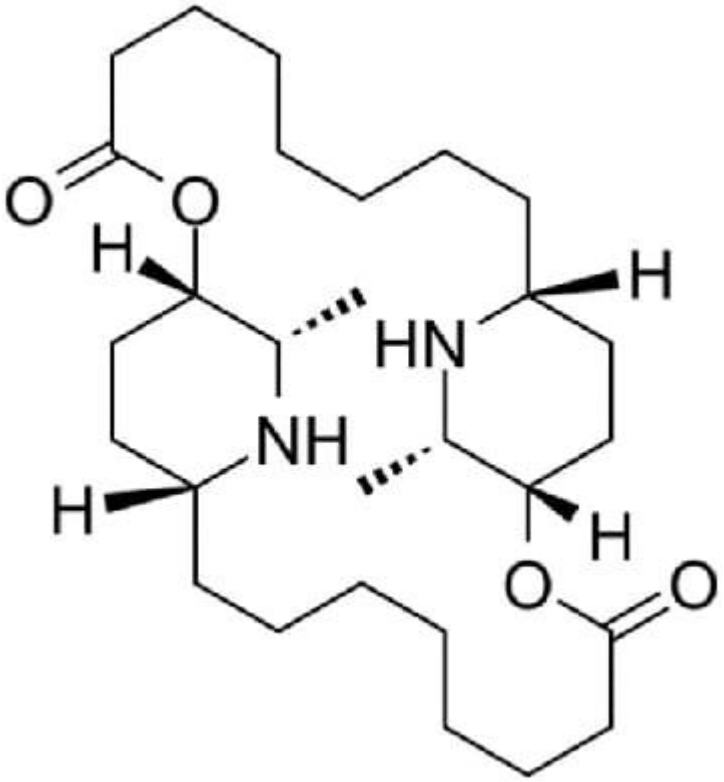
DRUG PROFILE

1. Carpaine:

Molecular Formula: C14H25NO2

Molecular Weight: 239.35 g/mol.

Structure: 2 Car Paine



IUPAC Name: 1-(2-Methyl-1, 3-dioxolan-4-yl)-9-azabicyclo [3.3.1]nonane
Appearance: Typically white to off-white when purified

Melting Point: 118-120 C.

Solubility:

- Soluble in ethanol, Methanol, Chloroform, benzene Organic solvents in general.
- Slightly soluble in water

Stability:

- Carpaine is moderate stable at room temperature.
- It decomposes at high temperature especially beyond its melting point (~118-120 C), which may lead to structural breakdown.
- Begins to decompose at elevated temperatures, especially above its melting point (118-120 C)

Stable in neutral ti slightly acidic conditions.

- Unstable in strongly acidic or basic environments,
- Light- sensitive: Prolonged exposure to UV or direct sunlight can cause degradation.

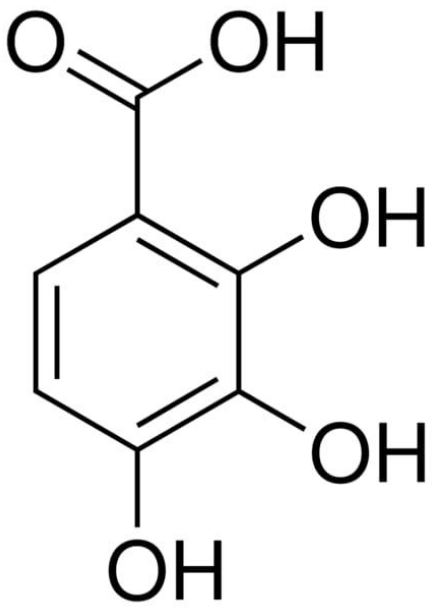
Should be stored in amber or opaque containers.

2. Gallic acid

Molecular formula: $C_7H_6O_5$

Molecular weight: 170.12 g/mol

STRUCTURE: 3 Gallic acid



IUPAC name: 3, 4, 5-Trihydroxybenzoic acid

Appearance: White to light yellow crystalline powder

Melting point: ~251 °C

Solubility: Soluble in water, alcohol, ether, and acetone

Stability: Stable under dry conditions; can degrade under light or alkaline pH

5. MATERIALS AND METHODS

Apparatus:-

- 500 ml soxhlet–extraction apparatus
- 500 mls round bottom flask
- digital weighing balance
- viscometer
- manual grinder, Mortar Pestle
- Sieve
- Beaker
- PH Meter
- Heating Mentle
- Magnetic Stirring

Chemical:-

- Potassium sorbet
- Sugar
- Honey
- Ethanol or Methanol
- Propylene Glycol
- Sodium hydroxide

Sample Preparation:

Collect the fresh papaya leaves and wash them thoroughly with water to remove dirt and impurities

Dry the papaya leaves using methods like air drying, oven drying, or freeze-drying to remove excess moisture.

Grind or crush the dried papaya leaves into a fine powder to increase the surface area for extraction

Soxhlet-extraction of the papaya leaf liquid Extraction Procedure:

1) In this method, 20-50 grams coarsely ground crude drug is placed in porous bag or thimble made up by strong filter paper which is placed in chamber of the Soxhlet extractor.

2) Fill the round bottom flask with 200-300 mL of your chosen solvent (e.g., ethanol).

3) Connect the soxhlet extractor above the flask and attach the condenser on top.

4) Put the round bottom flask in heating mental & add some glass beds to the flask to avoid bumping.

5) Ensure tight connection to prevent vapor loss.

6) Add suitable solvent like ethanol, methanol, ethyl acetate, chloroform etc. by using funnel to the top of tube of condenser then it passed to the soxhlet chamber.

7) The chamber fills and siphons back into the flask repeatedly (6-8 hours or until the solvent in the siphon tube becomes clear).

8) The solvent is passing through the drug material in soxhlet chamber to siphon tube & when sufficient amount of solvent is pass to the level of siphon tube then the solvent drips into the round bottom flask.

9) The extracting solvent in flask is heated at the temperature of boiling point if the solvent (70-80°c) & vapour is passing through the vapour tube to the condenser & vapour is condensed in condenser.

10) When vapour is condensed then it converts into liquid & liquid is drips into the thimble containing crude drug drop by drop.

11) This solvent with dissolved chemical constituents fills the chamber & also fills siphon tube.

12) When level of this solvent rises to the return point of siphon tube then it falls to the round bottom flask & completes one cycle & it repeats for 3 times. It is continues process.

13) Filter the extract if needed and concentrate it using a rotary evaporate or gentle evaporation.

Fig: 4 Soxhlet Apparatus &Drug

Fig: 5 soxhlet Apparatus Assembly

Fig: 5 soxhlet Apparatus Assembly

Phytochemical tests:-

Sr. No	Chemical Test	Procedure	Observation
1.	**Alkaloids Test** Mayer's Test	2ml Extracts + few drops of Mayer's reagent.	Creamy white or pale yellow precipitate
2.	Wagner's Test	2 ml Extract + few drops of Wagner's reagent	Reddish-brown precipitate
3.	Dragendroffs Test	2 ml Extract + few drops Dragendroffs reagent	Orange or reddish-brown precipitate
4.	TLC test	Mobile Phase=Methanol: ammonia (9:1)/ Cholororm:methanol (9:1) Stationary Phase= Whatsman filter paper	Orange/red spots

Table no.2 phytochemical tests

1. Alkaloid Test

Mayer's test:

Purpose: Detects the presence of Alkaloids

Procedure:

1. Take 2 mL of the plant extract in a test tube.
2. Add a few drops of Mayer's reagent
3. Mix gently.

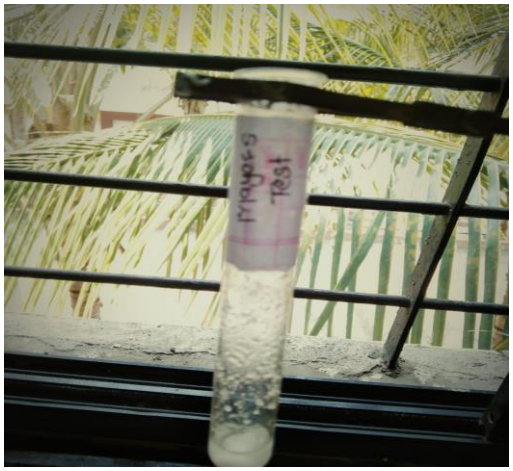


Fig: 6 Alkaloid test: Mayer's test

Positive Observation:
Creamy white or pale yellow precipitate indicates alkaloids.

Wagner's Test:

Procedure:
Take 2 ml of the prepared filtrate.
Add a few drops of Wagner's reagent.

Observation: Reddish-brown precipitate, color **indicates the presence of Alkaloids**

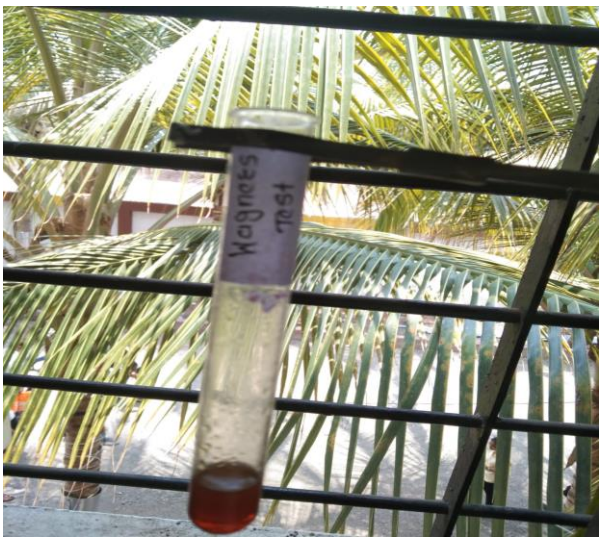


Fig: 7 Wagner's Test

3. Dragendorffs Test:

Reagent: Dragendorffs reagent (Potassium bismuth iodide)

Procedure: Take 2 mL of the prepare filtrate.
Add a few drops of Dragendorffs reagent.

Positive Observation:
Orange or Reddish- brown precipitate indicates alkaloids.

Fig: 8 Dragendorffs Test

Thin Layer Chromatography (TLC):-

1. Preparation of TLC Plate:

Draw a faint pencil line about 1-2 cm from the bottom edge of the plate (baseline)

2. TLC Plates: Pre-coated silica gel 60 F254

3. Solvent system: based on phytochemicals targeted. Examples:
For alkaloids: Methanol: ammonia (90:10:1) or Chloroform: methanol (90:10:1)

Capillary tubes (For spotting)

UV lamps (254 nm and 366nm)

Spray Reagents:
Alkaloids: Dragendorffs reagent
Glassware's, Gloves, etc.

Sample preparation:

1. Take 5-10 ml of papaya leaf syrup.
2. Evaporate gently under reduced heat to remove most of the water and sugar content.
3. Reconstitute residue in a small volume of methanol (e.g., 1-2 mL).
4. Filter the solution through a fine filter paper or syringe filter.

III. TLC Procedure:

1. Prepare the Plate:
    1. Use a silica gel-coated TLC plate.
    2. Draw a pencil line 1 cm above the bottom as the spotting line.

2. Spotting
1. Use a capillary tube to tube to spot small volume (1-2ul) of the prepared extract on the plate.
2. Allow to dry, and repeat spotting if needed to concentrate.

3. Prepare mobile phase:
1. Mix your selected solvent system in a clean TLC chamber.
Line the chamber with filter paper to saturated atmosphere, then close for 15-30 minutes.

4. Develop the Plate:

1. Place the TLC plate upright in the chamber without touching the solvent line.
2. Allow solvent front to rise to ~3/4 height of the plate.
3. Remove plate and immediately mark the solvent front.

5. Dry the plate: at room temperature or gently with air.

6. Visualization:

1. Under UV light (354 & 366):
Observe any fluorescent spots.

3. Spray with reagents depending on compounds class:

- Dragendorffs reagent: Orange/ red spots for alkaloids

IV. Calculation of RF values:

$$RF = \frac{\text{Distance travelled by compound}}{\text{Distance travelled by solvent front}}$$

V. Interpretation:

- Compare Rf values and spot color with standard references or markers (e.g., quercetin for flavonoids).
- Multiple spots may indicate multiple constituents.

Formulation Table:

Sr.no.	Ingredients	Formulation f1	Formulation f2	Formulation f3
1.	Papaya Leaf Extract	6ml	8ml	10ml
2.	Purified Water	15ml	13ml	11ml
3.	Sucrose	7.5 g	6.5 g	5.5 g
4.	Sorbitol		1.5 mL	2mL
6.	Sodium Benzoate	45 mg	45 mg	
7.	Potassium Sorbets			45 mg
8.	Propylene Glycol	6ml	8ml	10ml
9.	Total	30ml	30ml	30ml

Table no.3 Formulation Table

Procedure For Papaya Leaf extraction

1) Material Needed:

- **Selection of Drug & Polymer.**
  Choose the active Ingredient for the use of preparation & with high quality

- Fresh Papaya leaves (or dried if not available)
- Distilled/purified water
- Sweeteners (sucrose/sorbet)
- Preservatives (Sodium benzoate/potassium sorbate)
- Propylene glycol
- Flavour and Colour (Optional)

II. Extraction of Papaya Leaf:

A. If using Fresh Leaves:

1. Washing: wash 50-100 g fresh young papaya leaves thoroughly under clean water

2. Place the powdered sample into a thimble made of filter paper or cloth.

3. Insert the thimble into the soxhlet extractor.

Fig: 9. Extraction Process

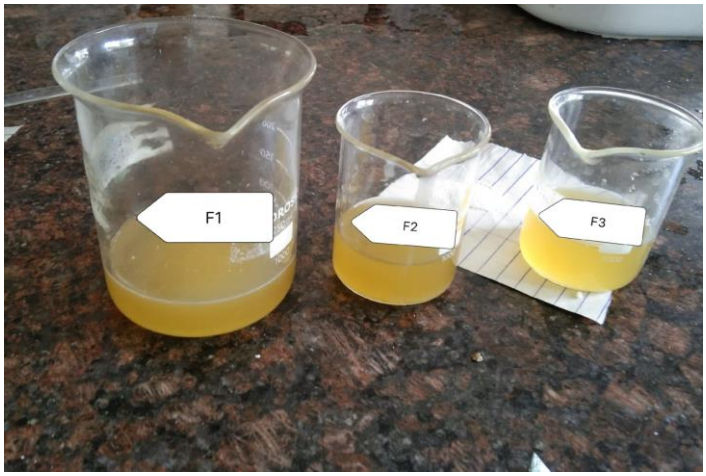


Fig: 10. Preparation of syrup

B. Solvent Preparation:

1. Fill a round- bottom flask with 200-300 ml of the chosen solvent (ethanol is commonly used for polar compounds).

C. Assembly of soxlet apparatus

1. Connect the round-bottom flask, Soxhlet extractor, and condenser.
2. Ensure and the system is clamped securely.

D. Extraction:

1. Heat the solvent using heating mantle or water bath vaporizes, condenses in the condenser, and drips into the sample in the thimble.
2. The chamber fills and siphons the extract back into the flask
3. Continue the cycle for 4-6 hours or until the solvent in the siphen become colorless.

Post-Extraction:

1. Allow the system to cool
2. Carefully dismantle the apparatus.
3. Filter the extract if necessary

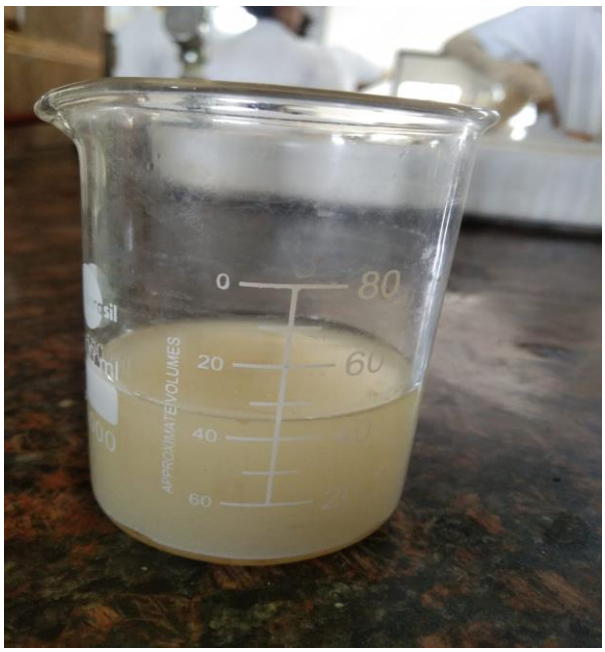


Fig: Formulation Prepare

Evaluation Parameter:

SR.NO	TEST	Procedure	Observation
1	Colour	Visually inspect the papaya leaf extraction syrup	Yellowish Creamy
2	Odour	Smell the formulation carefully.	Odour should be characteristics
3	Appearance	Visually observe	Uniformity, clarity present
4	PH	Calibrate a digital pH meter using buffer solutions .Measure pH of 10 mL of sample in a beaker	The PH of 6.84-7.64
5	Particle Size	Use the Optical microscope	Particle size range will be the observe 50-1000 micrometer
6	Viscosity	Use a Brookfield viscometer. Place about 50 mL of sample in the beaker.	The observe 10–50 cP (centipoise)
7	Sedimentation Rate	Fill a graduated cylinder with the papaya leaf extraction syrup Let it stand undisturbed for 24 –72 hours.	Sedimentation rate was found SR=0.166cm/h
8	Stability Testing	Store at room temp, refrigerated, Accelerated	**Storage Conditions:** • 4 °C (Refrigerated) • 25°C / 60% RH (Room Temperature) • 40 °C / 75% RH (Accelerated)

Table no.4 Evaluation Parameters

1. Colour

Visually inspect the papaya leaf extraction syrup against a background the colour should be the **yellowish creamy**

Fig. 13 colour testing

2. Odor

Smell the formulation carefully. The odour should be **characteristics**

3. Appearance

Visually observe for **uniformity, clarity**, and any signs of aggregation or precipitation.
Uniform, homogenous suspension without clumps or visible particles.

4. PH

Calibrate a digital pH meter using buffer solutions (pH 6.84, 7.64).
Measure pH of 10 mL of sample in a beaker.

The PH of papaya leaf liquid extraction is **7.64**

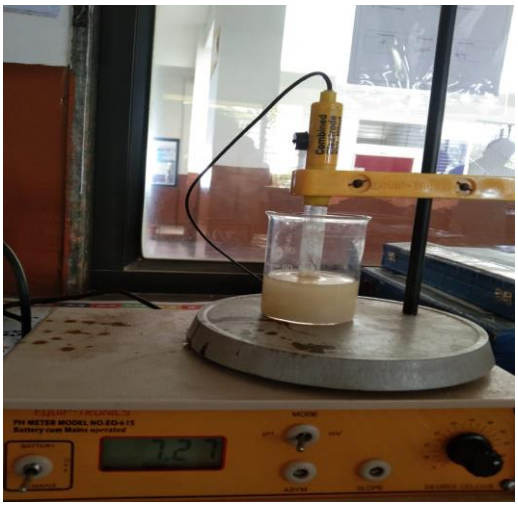


Fig.15 PH meter

5. Particle Size

Use the Optical microscope then solution is spread on the plate then observe the particle size
The particle size range will be the observe **100 – 500 nm**

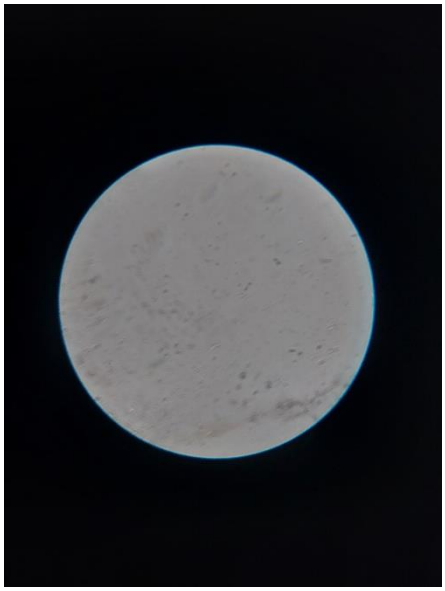


Fig 16: particle size

6. Viscosity

Use a Brookfield viscometer.
Place about 50 mL of sample in the beaker.
Insert spindle and record viscosity at a set rpm.

Should allow easy pouring or syringe ability.

The observe 10–**50 cP (centipoise**)

7. Sedimentation Rate
Fill a graduated cylinder with the
Let it stand undisturbed for 24 –72 hours.
Observe and measure any sediment**.**
Low or no sedimentation.
If sediment forms, it should be easily dispersible

Result:

SR=Hs/t

Hs=Height of sediment layer
T= time in hours

SR=4/24
SR=0.166cm/hr.

8. Stability Testing

Storage Conditions:

- **4°C (Refrigerated)**
- **25°C / 60% RH (Room Temperature)**
- **40°C / 75% RH (Accelerated)**

Result and discussion:-
1) Identification test of (Alkaloids compound)

Test name	**Procedure**	**Observation**	Confirmation test
Alkaloids test Mayer's Test: Wagner's Test: Dragendroffs Test	2ml Extract + few drops of Mayer's reagent 2 ml Extract + few drops of Wagner's reagent 2ml + few drops Dragendroffs reagent	Creamy white or pale yellow precipitate Reddish-brown precipitate Orange or Reddish-Brown Precipitate	Pass Pass pass
TLC test	1% solution prepared methanol+ ethyl acetate + Ammonia + dote the sample 0.1ml	0.42 cm sample was moved Mixture and the identify compound	Pass

Table: 5 confirmation identification test

2) Evaluation parameter of Papaya Leaf extraction syrup

Formulation	F1	F2	F3
Colour	Yellowish Creamy	Yellowish Creamy	Yellowish Creamy
Odour	characteristics	characteristics	characteristics
Appearance	Uniformity Clarity Observe	Uniformity Clarity Observe	Uniformity Clarity Observe
Consistency	Excellent	Good	Excellent
pH	6.84	7.64	7.58
Particle Size	50– 1000 nm	50 – 1000 nm	50 – 1000 nm
Viscosity	10–50 cP	10–40 cP	10–45 cP
Sedimentation Rate	0.1176cm/hr	0.1176cm/hr	0.1176cm/hr
Stability Testing	• 4 °C (Refrigerated) • 25 °C / 60% RH (Room Temperature) • 40°C / 75% RH (Accelerated)	• 4 °C (Refrigerated) • 25°C / 60% RH (Room Temperature) • 40°C / 75% RH (Accelerated)	• 4°C (Refrigerated) • 25°C / 60% RH (Room Temperature) • 40°C / 75% RH (Accelerated)

Table 6. Confirmation Evaluation test of Papaya Leaf Extraction Syrup

CONCLUSION.

Based on the available literature, it can be concluded that both CPLE and rhIL-11 have their benefits and limitations in the treatment of thrombocytopenia. In developing countries, where most of the population remains in middle or low-income groups, they require efficient and cost-effective treatment of low thrombocyte count. Hence, CPLE emerges as an alternative therapy for the same which has fewer side effects. Papaya leaf extract syrup is rich in pharmacologically active compounds like carpaine and flavonoids. F2 formulation is often the best balance between stability, phytochemical content, and clarity. Useful for supportive therapy in dengue, immune modulation, antioxidant protection, and general wellness. Thrombocytopenia treatment, Papaya leaf extract has been found to increase platelet count and improve

thrombocytopenia condition. The extract exhibit antioxidant properties, which can healp protect against oxidative stress and cell damage.

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