



Original Research Article

Formulation and evaluation of medicated syrup of podophyllum (May Apple) extract

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ABSTRACT

Cancer is an unprecedented deadly disease. Several studies have indicated a possible role of natural products in the treatment of several disorders with different applications being used as antiviral, antifungal, antibacterial and anticancer agent. Podophyllum or May apple extract syrup is prepared from the alcoholic extract of May apple. Podophyllum or apple extract syrup is easy to prepare and helps with many conditions and is suitable for the patient. This article deals with the preparation of apple syrup on a laboratory scale. Various parameters were evaluated such as PH, viscosity, density, stability test. The syrup was determined to be stable and ready for technology transfer.

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1. Introduction

1.1. Cancer and India scenario

The number of Indians with cancer is expected to increase from 26.7 million in 2021 to 29.8 million in 2025. The prevalence is high. The highest rates last year were in the North (2,408 patients per 100,000) and the Northeast (2,177 per 100,000). It is higher in men. According to the Indian Council of Medical Research report on “The burden of cancer in India”, seven cancers that account for more than 40% of the total disease burden are: lung (10.6%), breast (10, 5%), esophagus (5.8%), mouth (5.7%), stomach (5.2%), liver (4.6%) and cervix (4.3%). Explanation of projections for the period 2021-2025. According to the National Center for Disease Research and Informatics (NCDIR), humans will contribute 14.7 million years of life lost. (YLL), 0.72 million disability-adjusted life years (YLD) and 15.5 million disability-adjusted life years (DALY) by 2025. The number for women will be 13,6 million YLL, 0.69 million YLD and 14.3 DALY.¹ Possible

role of Podophyllum or apple in cancer In a recent study, podophyllotoxin derivatives showed promising cytotoxicity against a wide range of human cancer cell lines HL- 60, A-549, HeLa and HCT-8.² In another study, podophyllotoxin was shown to activate the stress signaling pathway of the pro-apoptotic endoplasmic reticulum. Intraperitoneal injection of podophyllotoxin inhibited the growth of P-815, P-1537 and L-1210 tumor cells.³ The anti-tumor activity of this agent is more or less similar to that of paclitaxel.⁴ Podophyllotoxin has also been shown to have fewer hematological and biochemical side effects.⁵

Herbal syrup is made from invert sugar and reported here.

1. *Syrup*: Syrup can be defined as a concentrated solution containing pure sugar and water. In syrups of other types of syrup solutions. Syrups may or may not contain drugs or mixed flavors. When syrups without drugs but with flavoring agents are said to be flavored or non-medicated syrups⁶
2. *Flavored*: Syrups are often used as a means of masking the unpleasant drug effects (seen) in medicinal syrups.

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Sugar-based syrups are present in syrups in large quantities and are often susceptible to bacterial contamination used as preservatives. In particular, here, medicated syrup using invert sugar base has been prepared and formulated to avoid microbial contamination, crystallization, pleasant taste for diabetic cancer patients, and stability and shelf life. Use of the formula longer. Chemical excipients and preservatives used in very small amounts in herbal syrups, medicinal or Ayurvedic medicines. These chemical excipients can have side effects and are often carcinogenic and are certainly not inert to long-term side effects. Ayurvedic formulations are liquid forms of drugs or combinations of drugs. However, the combination of medicinal herbs in the form of syrups produces herbal syrups.⁶

3. *Herbal syrup*: Herbal syrup is a concentrated herbal tea, preserved in sugar or honey. Historically, herbal syrups were used to sweeten the taste of bitter medicinal herbs to make them more palatable and extend their shelf life. They are a versatile alternative to alcoholic beverages for children or those who avoid alcohol. The classic herbal syrup that many people use is a syrup used to boost immune function and fight infections. Herbal syrups can be used as medicine or flavouring.⁷
4. *Herbal medicated syrup*: Herbal syrup containing extracts of medicinal herbs for medical use can be classified as herbal medicine syrup. These extracts may be used from alternative and complementary medicine, Ayurvedic or herbal medicine classification systems or pharmacological classification systems which may contain invert sugars or baselines with or without alcohol. The alcohol itself acts as a preservative in herbal syrups.⁸

This research paper deals with the preparation of herbal medicine syrup based on invert sugar.

2. Materials and Methods

Syrup decoction is prepared by the method of drinking decoction. May apple extract is obtained as a fine extract from Herbal Creations Pvt Ltd. Furthermore, the filtered extract and the extracts in the amounts used as indicated in the table were used to prepare a formulation on a laboratory scale, which was then mixed with invert syrup. Transferred to obtain 100 ml of May apple extract medicinal syrup. Suitable dyes, flavoring agents have been added to it. This resulting syrup is transferred to an amber bottle, tightly closed and placed in a cool, dry place.

Table 1 gives the final formulation prepared at laboratory scale selected for scale up.

2.1. Herbal medicinal syrup formula

The following ingredients are used in the formulation:

1. *May Apple Extract*: It is used in various herbal and Ayurvedic cancer treatments. The alcohol extract was obtained with Soxhlet, then filtered and used.
2. *Orange Oil*: It is made from the fruit of the citrus aurantium tree. It contains not less than 2.5% volatile oil.⁹
3. *Alcohol*: Procedure uses it in small amounts as a preservative. iv. *Invert Sugar Base*: This is prepared by mixing 2 cups (480ml) of water with 4.4 cups (1kg) of granulated sugar and 1/4 teaspoon of whipped cream in a saucepan. The mixture is boiled over medium heat until it reaches 236°F (114°C), stirring occasionally. Then, remove the mixture from the heat, cover and allow to cool.^{10,11}

The roles of these ingredients are shown Table 2. Shows recipe of the final herbal.

To prepare the final herbal syrup, 30 ml of May apple extract and 8 ml orange oil and 22 ml of alcohol were added to 40 ml of invert sugar, slowly mixed together then stirred. The final herbal syrup was prepared and then sent for evaluation. An herbal syrup was prepared and the solubility was checked by visually observing the clarity of the solution and passing the solution after filtration through a suitable medium. Bright and clear syrup.¹²

2.2. Evaluation parameters

The color, odor, taste, pH, density, specific gravity and viscosity of the prepared herbal medicinal syrup were evaluated. Density It is evaluated using the formula given below, Sensory properties 1) Reddish color 2) Aroma 3) Sweet taste 4) Appearance Transparent and at accelerated temperature.

2.3. Stability testing

The final nine portions of the herbal syrup were removed and kept thawed at an accelerated temperature of 4°C and °C at room temperature of °C and 47°C, respectively. Samples were tested for all physico-chemical parameters, turbidity, and sand homogeneity within 24h, 48h and 72h to observe the change.

2.4. Density

It was evaluated by Formula as given below,

Formula for density: Density of liquid under test (syrup) = weight of liquid under test/volume of liquid under test = w_3/v

2.5. Specific gravity

Specific Gravity was evaluated by the formula as given below

Specific gravity of liquid under test (syrup) = weight of liquid under test /weight of water = w_5/w_4 .

2.6. Viscosity

Viscosity was determined using the following formula

$$\text{Viscosity} = \frac{\text{Density of test liquid} \times \text{Time required to flow test liquid}}{\text{Density of water} \times \text{Time required to flow water}} = \frac{\text{Viscosity of water}}{\text{Density of water}}$$

2.7. pH

pH was determined on pH meter

The evaluated parameters of the final extract have been given in Table 3.

Table 1: Role of ingredients in herbal syrup

Sr. No.	Ingredient	Role
1.	May apple Extract	Anticancer
2.	Orange oil	Flavoring agent
3.	Sugar Base Invert	Preservative
4.	Alcohol	Preservative
5.	Amaranth red	Coloring agent

Table 2: Final formulation as may apple extract as medicated herbal syrup

Sr. No.	Ingredient	Quantity
1.	May apple extract	30 ml
2.	Orange oil	8 ml
4.	Invert Sugar base	40 ml
5.	Alcohol	22 ml

Table 3: Evaluation parameters for herbal medicated syrup of may apple extract (Final Formulation)

Sr. No.	Parameter	F1
1.	Density	1.50gm.
2.	Specific gravity	0.63000
3.	Viscosity	3.95cp.
4.	pH Determination	Neutral
	a) pH paper	
5.	b) pH meter	7.05
	Organoleptic Characters	
	1) Color	Reddish
	2) Odor	Aromatic
	3) Taste	Sweet
	4) Appearance	Clear

3. Results and Discussion

The final formulation was prepared, evaluated and found to be stable. The final formulation is ready for technology

transfer and can be adopted by researchers and industries to produce similar formulations on a large scale.

4. Conclusion

Herbal formulation and F1 can be formulated on a large scale. The herbal and Ayurvedic industries involved in the preparation and formulation of herbal syrups can adopt this ready-to-use preparation.

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7. Conflict of Interest

None.

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