



Original Research Article

Formulation and evaluation of herbal syrup of Arjuna extract

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ARTICLE INFO

Article history:

Received 13-04-2023

Accepted 25-05-2023

Available online 10-06-2023

Keywords:

Herbal Syrup

Arjuna

Formulation

Evaluation

ABSTRACT

Arjuna's anti-inflammatory properties may be directly related to its anti-cancer properties. Terminalia arjuna bark is commonly known as Arjuna or Arjun bark and is abundant throughout India. This plant contains 15% tannins, triterpenoid saponins, flavonoids, calcium, aluminum and magnesium salts as well as dyes and sugars which are other components of Arjuna. The *Terminalia arjuna* plant has many therapeutic properties and can treat many ailments, including diseases of the heart and circulatory system. This plant is an excellent hypoglycemic, anticoagulant, hypotensive, antiviral, antithrombotic, antifungal and antibacterial means. The plant's therapeutic properties related to heart health are due to the triterpenoids found in the arjuna plant. Likewise, the flavonoids and tannins naturally present in this herb have anti-cancer properties. This review provides important insight into the therapeutic profile, traditional uses, plant chemistry, and different parts of the plant. Lab-scale formulation was made with herbal syrup and evaluated for several parameters such as pH, viscosity, density, stability testing during formulation evaluation. is a stable and ready-to-know formula. F1, F2, F3 and F4 have been prepared with different amounts of ingredients such as alcohol, sugar and a final amount of syrup. Results show that Herbal Syrup Formula 4 (F4) is more stable than other forms.

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1. Introduction

1.1. Arjuna

Terminalia arjuna, commonly known as arjuna, belongs to the family Combretaceae. Its bark decoction is used in the Indian subcontinent to treat angina, hypertension, congestive heart failure, and dyslipidemia, based on the observations of ancient physicians for centuries. century.¹ According to estimates by the World Health Organization, more than 75% of the world's population is still dependent on medicines of plant origin, usually obtained by healers.² Arjuna is a powerful herb that has been widely used in Ayurvedic medicine for a very long time. Because of its strong cardioprotective and cardioprotective effects, it is

mainly used to treat heart disease.³ Since ancient times, people have used the therapeutic powers of arjuna bark to treat a variety of ailments.⁴ Arjuna is a remarkable herb that promotes heart health and eases the effects of anxiety and uncertainty.⁵ It improves cardiovascular health and controls heart rate.⁶ The rich minerals in arjuna help prevent bone loss and improve bone mineral density. Due to its anti-ulcer activity, it is an effective treatment for ulcers, especially peptic ulcers.⁷ It effectively treats bleeding disorders because it regulates bleeding.⁸ It benefits more from frequent urination and polyuria because it reduces the frequency of urination. It has strong astringent properties and controls leukemia.⁹

1.2. Taxonomical classification¹⁰

1. Kingdom: Plantae

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2. Sub-kingdom: Tracheobionta
3. Division: Magnoliophyta
4. Subdivision: Spermatophyta
5. Class: Magnoliopsida
6. Order: Myrtales
7. Family: Combretaceae
8. Genus: Terminalia
9. Species: T. arjuna

1.3. Herbal syrup

Herb syrup is prepared by adding a concentrated herbal extract with sugar, and alcohol was also used. Herbal syrup was made with decoction. Mixing a decoction of herbs with sugar helps to thicken the recipe and preserve it. This increases the shelf life of the formula. Added sweeteners can also help enhance the taste of certain herbs. The resulting syrup is delicious! It is defined as a thick, sticky liquid consisting of a concentrated solution of sugar and water with or without added flavoring or medicinal ingredients¹¹⁻¹³.

2. Following are the ingredients used in formulation

1. *Arjuna Extract*: It is used in various herbal and ayurvedic treatment of cancer. The Soxhlet extracted alcoholic extract was obtained which was further filtered and used.
2. *Orange oil*: It consist fruit of plant citrus aurantium belonging to family: Rutaceae.it contain not less than 2.5% of volatile oil. It uses as antioxidant, anti-cancer and neurodegenerative disorder¹⁴
3. *Alcohol*: It uses in small quantity act as preservative.
4. *Invert sugar base*: It was prepared by mixing 2 cups (480 mL) of water with 4.4 cups (1 kg) of granulated sugar and 1/4 teaspoon of cream of tartar in a pot. The mixture was boiled over medium heat until it reaches 236°F (114°C), stirring occasionally. Next, remove the mixture from the heat, cover, and let cool.^{15,16}.

Table 1: Role of ingredients in herbal syrup.

Sr. No.	Ingredient	Role
1.	Arjuna Extract	Antioxidant, Free Radical Scavenging
2.	Orange oil	Flavoring agent
3.	Sugar Base Invert	Preservative
4.	Alcohol	Preservative
5.	Amaranth red	Coloring agent

3. Materials and Methods

Herbal syrup is prepared by the method of decoction. Arjuna extract is obtained as a fine extract from Herbal Creations Pvt Ltd. The extract was prepared with an ethanol extract to obtain ethanol-specific active ingredients by the Soxhlet

extraction method. Furthermore, the extract was filtered, and the extracts of the quantities used as shown in the table were used to prepare formulations F1 to F4. All extracts were mixed and 50ml of syrup was obtained. Dyes, flavoring agents are added to it. This resulting syrup is transferred to an amber bottle, tightly closed and placed in a cool, dry place. Preparation of medicinal syrup: The preparation of medicinal syrup is carried out according to the quantities listed in Tables 2, 3, 4 and 5 and the evaluation parameters are given in Table 6.

Table 2: Formulation No.1 (F1) - for 50ml.

Sr. No	Ingredient	Quantity
1.	Arjuna extract	30 ml
2.	Orange oil	5ml
4.	Invert Sugar Base	15 ml

Table 3: Formulation 2 (F2) - for 50ml.

Sr. No.	Ingredient	Quantity
1.	Arjuna extract	15 ml
2.	orange oil	5ml
3.	Invert Sugar Base	20 ml
4.	Alcohol	10 ml

In above formula (F2), we used alcohol because in the formulation number 1 (F1), sugar was not able to inhibit the growth of fungi, so we use alcohol.

Table 4: Formulation 3 (F3) - for 50ml.

Sr. No.	Ingredient	Quantity
1.	Arjuna extract	25 ml
2.	Orange oil	5ml
3.	Invert Sugar Base	15 ml
4.	Alcohol	5ml

The formulation number 2 was rejected because of more quantity of alcohol is use. In this formula we use alcohol as minimum quantity.

Table 5: Formulation 4 (F4) – for 50ml.

Sr. No.	Ingredient	Quantity
1.	Arjuna extract	20 ml
2.	Orange oil	5ml
4.	Invert Sugar base	20ml
5.	Alcohol	05 ml

Following evaluation parameters were performed on formulation 4 (F4).

3.1. Evaluation parameter

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

3.2. 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 .

3.3. Viscosity

Viscosity was determined using the following formula

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

3.4. pH

pH was determined on pH meter.

4. Result and Discussion

The final formulation (F4) was obtained is stable than formulations F1, F2, F3. The formulation (F4) was obtained by minimizing the error in formulation F1, F2, F3. The formulation (F4) having antioxidant property hence it will be very helpful for researchers as well as industries to make the similar formulations on large scale.

Table 6: Evaluation of herbal syrup

Sr. No.	Parameter	F1	F2	F3	F4
1.	Density	1.50gm.	1.43 gm.	1.30gm.	1.50gm.
2.	Specific gravity	1.389	1.383	1.376	1.365
3.	Viscosity	3.80cp.	3.75 cp.	3.90cp.	3.85cp.
4.	pH				
	Determination				
	a) pH paper	Neutral	Neutral	Neutral	Neutral
	b) pH meter	7.40	7.56	7.38	7.48
	Organoleptic Characters				
5.	1) Color	Reddish	Reddish	Reddish	Reddish
	2) Odor	Aromatic	Alcoholic	Aromatic	Aromatic
	3) Taste	Sweet	Sweet	Sweet	Sweet
	4) Appearance	Turbid	Turbid	Clear	Clear

5. Conclusion

The Herbal formulation was prepared and F4 can be formulated and prepared on large scale.

6. Acknowledgment

I express my gratitude to Dr Amit G. Nerkar, for funding this project through Ateos Foundation of Science Education and Research and for his precious suggestions and guidance for the completion of my project. We would like to express our obligation to CAYMET's Siddhant College of Pharmacy, for providing all the necessary facilities to conduct the research work.

7. Source of Funding

None.


8. Conflict of Interest

None.

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Cite this article: Nerkar AG, Dumbre RK, Badar S. Formulation and evaluation of herbal syrup of Arjuna extract. *Curr Trends Pharm Pharm Chem* 2023;5(2):75-78.