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Original Research Article

Formulation and evaluation of herbal syrup of kalmegh extract

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ABSTRACT

The cultivation of Kalmegh (Andrographis paniculata), a plant with many medicinal benefits, has increased its importance as a medicinal plant. Considering the beneficial properties of the plant, it can be appreciated as a safe and important herb for humans. There are many different chemical constituents in this herb, but the main ones are lactones, diterpenoids, diterpene glycosides, flavonoids and flavonoid glycosides. It has a wide range of pharmacological effects, including antibacterial, hepatoprotective, antitumor, antitumor, hypoglycemic, immunomodulatory, and antihypertensive. Lab scale formulation is made with herbal syrup and evaluated for several parameters like pH, viscosity, density, stability test while evaluating the formula. is a stable and ready-to-know recipe. F1, F2, F3 and F4 are made 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.

1. Introduction

1.1. Kalmegh

Most of the world's population, especially in less developed countries, mainly depends on traditional doctors and herbal medicines to meet their basic health needs.[1] The association with conventional drugs poses a number of problems. For this reason, experts have recently revised their assessment of many medicinal plant species based on the differences between the species and their therapeutic potential. It is therefore essential to review previously published literature on this species to refresh our knowledge of them. Andrographis paniculata is one of them (Acanthaceae). It includes about 40 species and has been around for millennia. It is native to India Sri Lanka and is also distributed in different parts of Southeast Asia, China, America and the West Indies. It grows well in almost any soil so it is widely distributed. It has been cultivated for its recognized therapeutic potential.[2] The aerial parts and roots of A.paniculata have been widely used in the treatment of various diseases. He is called Mahatikta in (Sanskrit), Kiryato in (Gujarati), Mahatita in (Hindi) and Kalmegh in (Bengali).[3] Various studies have been done by researchers, followed by reports on the therapeutic potential of this herb. Phytochemical studies show that A.paniculata contains various compounds such as diterpenoid lactones, flavonoids and various compounds. Due to their presence, it has many pharmacological properties.[4–6] This phytochemistry and pharmacological properties of A.paniculata (extracts and compounds) shows it has potential antimicrobial antioxidant, anti-inflammatory protozoa, antidiabetic, anti-infective, immunostimulating, hepatoprotective, sex hormone regulation, liver enzyme modulation, cytotoxicity, insecticidal, neuroprotective

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activities, antitumor, antipyretic and antiplatelet.

1.2. Taxanomical classification

Fig. 1:

1. Kingdom: Plantae, Plants;
2. Subkingdom: Tracheobionta, Vascular plants;
3. Super division: Spermatophyta, Seed plants;
4. Division: Angiosperma
5. Class: Dicotyledonae
6. Subclass: Gamopetalae
7. Series: Bicarpellatae
8. Order: Personales
9. Tribe: Justicieae
10. Family: Acanthaceae
11. Genus: Andrographis
12. Species: paniculata

1.3. Herbal syrup

Herbal syrups prepared by adding concentrated extracts of herbs with sugar and alcohol have also been used. Herbal syrup is made with decoction. Mixing an herb 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 flavor of some 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 ingredients [7–9]

2. Following are the ingredients used in formulation

1. *Kalmegh 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 of fruit of plant citrus aurantium.It contains not less than 2.5% of volatile oil. It uses as antioxidant, anti-cancer, and neurodegenerative disorder. [10]
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. [11]

Table 1: Role of ingredients in herbal syrup.

Sr. No.	Ingredient	Role
1.	Kalmegh Extract	Antioxidant, Free Radical Scavenging, Anticancer
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. Kalmegh extract is obtained as a fine extract from Herbal Creations Pvt Ltd. The extract was prepared with an ethanol, extracted 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 were 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.	Kalmegh extract	7ml
2.	Orange oil	5ml
4.	Invert Sugar Base	38ml

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.

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

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

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

Sr. No.	Ingredient	Quantity
1.	Kalmegh extract	5ml
2.	Orange oil	2ml
3.	Invert Sugar Base	33ml
4.	Alcohol	10ml

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

Sr. No.	Ingredient	Quantity
1.	Kalmegh extract	8ml
2.	Orange oil	2ml
3.	Invert Sugar Base	33ml
4.3.	Alcohol	7ml

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

Sr. No.	Ingredient	Quantity
1.	Kalmegh extract	15 ml
2.	Orange oil	4ml
4.	Invert Sugar base	20ml
5.	Alcohol	11 ml

4. Evaluation parameter

4.1. 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.

4.2. 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.

4.3. Viscosity

Viscosity was determined using the following formula

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

4.4. pH

pH was determined on pH meter.

5. 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.	1.29gm.	1.50gm.
2.	Specific gravity	0.63000	0.6130	0.6250	0.6250
3.	Viscosity pH	3.95cp.	3.97cp.	3.86cp.	3.86cp.
4.	Determination				
	a) pH paper	Neutral	Neutral	Neutral	Neutral
	b) pH meter	7.05	7.50	7.35	7.35
	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

6. Conclusion

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

7. Source of Funding

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8. Conflict of Interest

None.

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