



Original Research Article

Formulation and evaluation of herbal syrup of turmeric extract

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ARTICLE INFO

Article history:

Received 02-03-2023

Accepted 10-03-2023

Available online 04-04-2023

Keywords:

Herbal Syrup

Turmeric

Curcuma Longa

Evaluation

Formulation

ABSTRACT

In the Indian subcontinent, turmeric (*Curcuma longa* Linn) is widely grown and consumed as a spice. Traditional medicine has used turmeric to treat a variety of ailments, such as diabetes, liver disease, and cough. Many studies have been conducted over the past decades to determine the pharmacological effects of turmeric and its derivatives. The main chemical component of turmeric, curcumin, has been shown to have pharmacological properties, including anti-inflammatory, antioxidant, anti-mutagenic, antidiabetic, and antibacterial properties. , protect liver, expectorant and anti-cancer. Turmeric, also known as *Curcuma longa* L. (root and rhizome), is a plant of high medicinal and commercial value, mainly used as a spice and functional food around the world. Three curcuminoids - curcumin (diferuloylmethane, the main ingredient that gives turmeric its yellow color), demethoxycurcumin, and bisdemethoxycurcumin - are the main active ingredients in turmeric. Volatile oils (zingiberene, atlantone, tomerol, etc.) also have pharmacological effects. In addition, turmeric contains proteins, resins and carbohydrates. Turmeric is a powerful antioxidant and has significant anti-inflammatory properties. Turmeric's anti-inflammatory properties may be directly related to its anti-cancer properties. 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. Turmeric

Turmeric, or *Curcuma longa* Linn., belongs to the family Zingiberaceae. The plant has many potential medicinal properties.^{1,2} It has a number of beneficial qualities including anti-inflammatory, biliary, hepatoprotective, blood purifier, antioxidant, detoxifying and regenerating liver tissue, anti-asthmatic, anti-cancer, anti-toxin, digestive and detoxifier. slightly, as pointed out in the

documentation.³⁻⁸ Plasma cholesterol levels can be lowered using curcumin. The heart and arteries are preserved by its antiplatelet activity. It also protects against DNA damage in lymphocytes.⁹ Parts of this plant contain curcumin, a type of flavonoid. About 60-70% of turmeric powder is carbohydrates, while other ingredients include 6-8% protein, 5-8%, 3-7% minerals, 3-7% essential oils, 2-7% fiber.¹⁰ and 1 to 6% curcuminoids. The phytochemicals in turmeric are found in diarylheptanoids, another group of curcuminoids that includes curcumin, demethoxycurcumin, and bisdemethoxycurcumin.¹¹ It has also been observed that *Zingiber officinale* Roscoe and *Curcuma longa* Linnaeus are the two main species of Zingiberaceae

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studied for a variety of pharmaceuticals, including anti-inflammatory, anti-angiogenic, antibacterial, analgesic, immunomodulatory, pro-apoptotic, anti-HIV and anti-HIV. Cancer.¹² Furthermore, some researchers have also found that curcumin, a polyphenolic natural product isolated from turmeric, interacts with various cellular and molecular targets and thus, exhibits a variety of pharmacological effects.¹³

1.2. Taxonomical classification¹⁴

1. Kingdom: Plantae
2. Subkingdom: Tracheobionta
3. Super division: Spermatophyta
4. Division: Magnoliophyta
5. Subclass: Zingiberidae
6. Order: Zingiberales
7. Family: Zingiberaceae
8. Genus: Curcuma
9. Species: longa
10. Scientific name: Curcuma longa

1.3. Active constituents

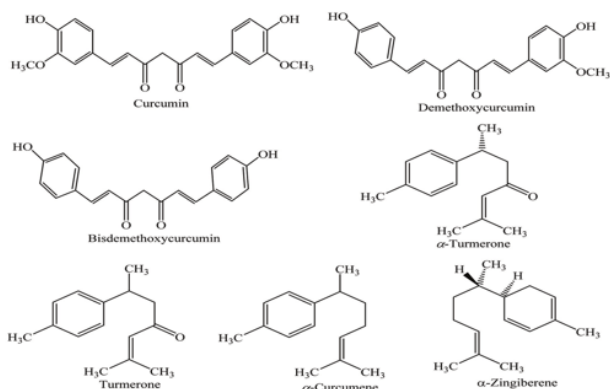


Fig. 1: Active constituents of Turmeric

The active constituent of Turmeric is shown in the figure viz Curcumin. Further the following are the active constituents of Turmeric, in a standard form, turmeric contains moisture (>9%), curcumin (5–6.6%), extraneous matter (<0.5% by weight), mould (<3%), and volatile oils (<3.5%). Volatile oils include d- α -phellandrene, d-sabinene, cinol, borneol, zingiberene, and sesquiterpenes). The active constituents of turmeric are shown in Figure 1. Curcumin, the active ingredient in the *Curcuma longa* plant, has received a lot of attention over the past two decades as an antioxidant, anti-inflammatory, and anti-cancer agent. In the summary of the phytochemistry and pharmacology of curcumin and its derivatives for their antitumor activity, their main mechanisms of action, and cellular targets has been provided based on data from the literature from

experimental and clinical reviews of curcumin in cancer cell lines, animal models and human subjects showed promising results.

1.4. 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 ingredients.^{15–17}

2. Following are the Ingredients Used in Formulation

1. Turmeric: 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 disorder.¹⁸
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.^{19,20}

Table 1: Role of ingredients in herbal syrup

Sr. No.	Ingredient	Role
1.	Turmeric	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. Turmeric 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.	Turmeric extract	7ml
2.	Orange oil	5ml
4.	Invert Sugar Base	38ml

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

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

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.	Turmeric extract	8ml
2.	Orange oil	2ml
3.	Invert Sugar Base	33ml
4.	Alcohol	7ml

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.	Turmeric extract	15 ml
2.	Orange oil	4ml
4.	Invert Sugar base	20ml
5.	Alcohol	11 ml

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

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

Density of test liquid × Time required to flow test liquid
Density of water × Time required to flow 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.	1.30gm.	1.50gm.
2.	Specific gravity	1.377	1.375	1.395	1.385
3.	Viscosity	3.99cp.	3.95 cp.	3.86cp.	3.76cp.
4.	pH				
	Determination				
	a) pH paper	Neutral	Neutral	Neutral	Neutral
	b) pH meter	7.87	7.80	7.40	7.45
	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

None.

8. Conflict of Interest

None.

9. 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.

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Cite this article: Nerkar AG, Nagarkar R. Formulation and evaluation of herbal syrup of turmeric extract. *Curr Trends Pharm Pharm Chem* 2023;5(1):26-29.