RESEARCH ARTICLE

Formulation and Evaluation of Herbal Cough Syrup

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Abstract

Introduction: Cough is one of the most common problems faced by all people. There are mainly two types of coughs one is dry cough and another one is wet cough; dry cough there is no mucous and secretion while in wet cough there is cough with mucous or secretion. Syrup is commonly used and popular dosage form which is used to cure cough and cold, because it having ease of patient's compliance.

Method: The herbal plants of the herbal cough syrup was selected due to their reported action that plays a preventive and curative role in prevention of cough. The ingredients of the syrup are honey, Ginger, Tulsi, liquorice, Cardamom, Fennel, Clove which act as expectorant and antitussive. The finished herbal syrup's quality was assessed for both pre and post formulation parameter. Formulation at the laboratory was evaluated for the number of parameters such as Colour, Odour, Taste, Ph determination, Viscosity and Specific Gravity.

Result and Discussion: Here, three batches were formulated by using honey base having various concentration such as 40%, 45% and 50 %w/v. The prepared syrup's physiochemical qualities, including its colour, odour, pH, taste was found to be suitable.

Keywords: Syrup, Honey base, Ginger, Tulsi, Liquorice, Cardamom, Fennel, Clove, Antitussive, Expectorant.

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Introduction

Herbal formulations are dosages form made up of one or more raw or processed herbs in exact amounts to offer targeted nutritional and cosmetic benefits as well as to identify, treat, alleviate diseases of human beings [1,2]. Syrups are aqueous preparations having a sweet taste and a viscous consistency. Syurps having some added medicinal substances are called as medicated syrups. Syrups are generally prepared to mask the taste of bitter or saline drugs. Herbal Plants and formulations are used for various diseases like diabetes, hypertension, kidney disease, arthritis, GIT problems, cough, cold, and other diseases also [3,4]. In cough syrup many types of herbal plants are used, for examples tulsi, ginger, cinnamon, turmeric, cardamom, black pepper, peppermint, clove, adulsa, liquorice. In herbal cough syrup part of the plant or whole plants are used for making herbal medicine since many years. Herbal formulations are mostly used in development and developing countries as a health care aid [5,6].

Abbreviations

%w/v = *percentage weight by volume (% w/V)*
GIT = Gastrointestinal tract
Gm = gram
°C = degree Celsius
hr = Hours
ml = milliliter
pH = Potential of Hydrogen
IP = Indian Pharmacopoeia
F1, F2 and F3 = indicate the Formulation number 1,2 and 3

Classification of cough:

1. *Types of coughs: Mainly there are two types of cough, which are classifies as follows (Table-1 & Figure 1)*
   I. Wet cough
   II. Dry cough [5]

2. *Classification of cough: [5,6]*

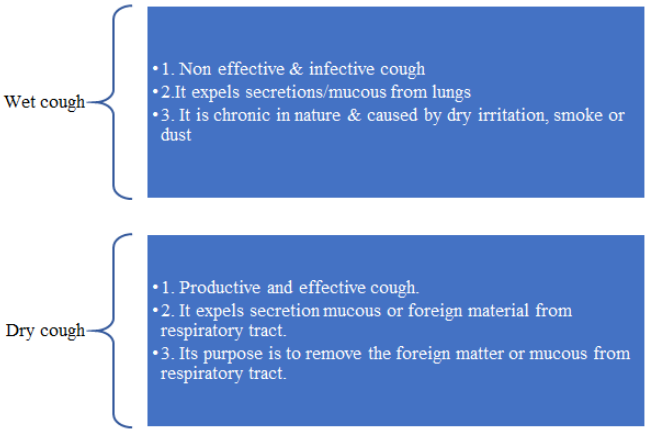

Figure 1: Classification of cough in two types.

Table 1: Classification of cough as per their name and duration of time

S.No.	*Name of cough*	*Duration of cough*
1	Acute cough	Note more than three weeks duration
2	Chronic cough	More than three weeks
3	Dry cough	No mucous or secretion
4	Wet cough	With mucous or secretion
5	Bovine cough	Soundless cough due to paralysis or larynx
6	Psychogenic cough	Self-conscious activity of the patient to draw attention
7	Paroxysmal cough	Spasmodic and recurrent
8	Cough from chest & throat	Productive or non-productive

Figure 2: Advantages of herbal medicine shows in the figure

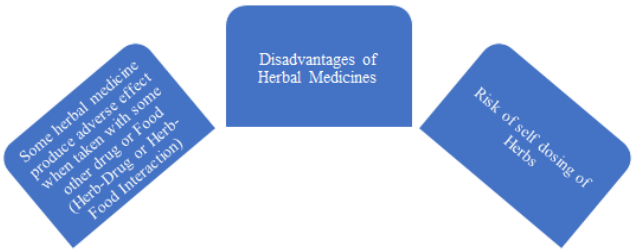

Figure 3: Advantages of herbal medicine shows in the figure

3. Herbal Treatment for cough

Now a days, herbal remedies are commonly used for the treatment of cough and herbal formulations are playing important role in various type of cough. In present days, therapies like cough suppressants are used for cough. The antitussive agent gives only symptomatic relief, these agents are contraindicated in asthma.

They also cause different serious adverse effect which includes respiratory depression, vomiting, nausea, sedation and also patients with diminished respiratory reserve. In the recent years, researchers are focusing on the herbal medicine which are having less side effect [7,8].

4. Advantages of Herbal Medicine

It is showing in the figure 2 [9].

5. Disadvantages of Herbal Medicines

It is showing in the figure 3 [10]

Material and Methods

The following herbal plants are used in the formulation of herbal syrup for the treatment of cough given in the Table 2.

Table 2: List of plants used in cough treatment with their properties [11-19]

S.No.	*Name of Plants*	*Biological Sources/Family*	*Chemical constituents*	*Property*
1	Tulsi	*Ocimum sanctum/ Labiateae*	Phenolic compounds, flavonoids, phenylpropanoids, coumarins, tannins, terpenoids, essential oils, fixed oils	Antiasthmatic Antitussive, relieve chest congestion, immunity booster [11]
2	Ginger	*Zingiber officinale/* Zingiberaceae.	Votatile oil, α-zingiberol; α-sesquiterpene alcohol α-bisabolene, α-farnesene, α-sesquiphellandrene, gingerone and shogaol	Antitussive, anti-inflammatory [12,13]
3	Liquorice	*Glycyrrhiza glabra* Linn/ Leguminosae	Glycyrrhizin (6–8%), sugar, starch (29%), gum, protein, fat (0.8%), resin, asparagin (2–4%), a trace of tannin and volatile oil	Expectorant, sweetening agent [14]
4	Fennel	*Foeniculum vulgare* Miller/ Umbelliferae	volatile oil, anethole, fenchone, Fenchone, fixed oil, proteins	Aromatic, Flavoring agent [15]
5	Cardamom	*Elettaria car-damomum/* Zingiberaceae	volatile oil, fixed oil, salts of potassium, mucilage, resin, starch, fibre, and ash	Aromatic [16]
6	Clove	*Eugenia caryophyllus/* Myrtaceae	volatile oil, eugenol, acetyl eugenol, gallotannic acid, and two crystalline principles; α- and β- caryophyllenes,	Expectorant, antioxidant properties [17]
7	Honey	Apis mellifera/Apideae	Moisture, Dextrose, Levulose (Fructose), Sucrose, Dextrin, Gums and Ash	Base, Viscosity modifies, anti-inflammatory [18]
8	Peppermint leaves	*Mentha piperita/* Labiatae	Menthol, menthyl acetate, isovalerate, menthone, cineol, inactive pinene, limonene	In cough, cooling agent [19]

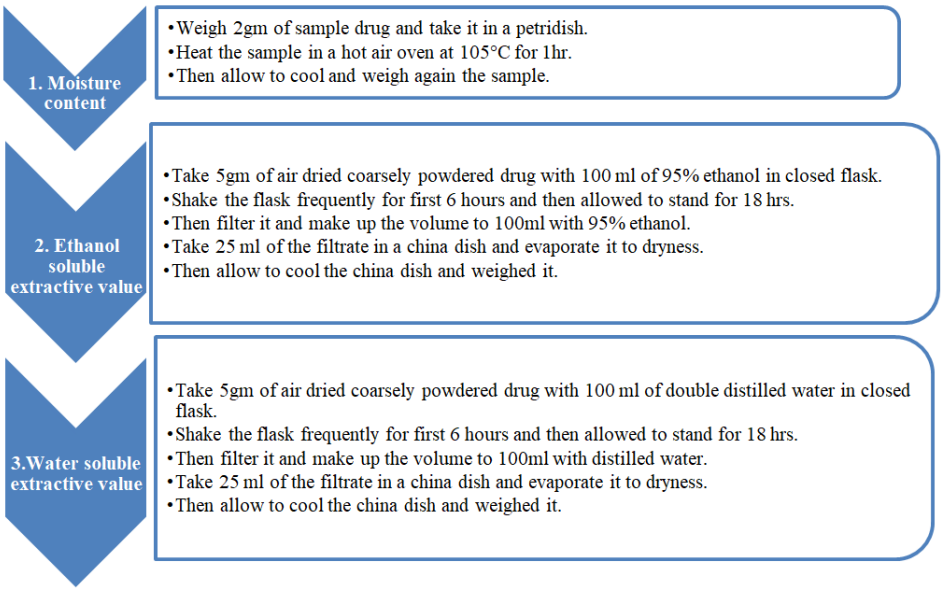

Figure 4: The parameters performed for the quality control of raw material

Quality Control of Raw Materials[21-23]

The parameters performed for the quality control of raw material used in the cough formulation (Figure 4) [20-23]

Preparation of Herbal extract and Syrup

- All herbal drugs are coarsely powdered and extracted with hydroalcoholic (50:50) solution, in a Soxhlet apparatus for 24 hrs. After that filter, collect the extract and concentrated it to the one forth part of the extract.
- For preparing the final cough syrup 40 ml, 45ml, 50 ml of the honey was used and added 20 ml, 15 ml and 10 ml of the herbal extract respectively was mixed slowly by continuous stirring.
- Herbal cough syrup was prepared and solubility was checked by observing the clarity of the solution visually (Table 3).

Table 3: Formulation Table with different composition

		Formulations (Quantity)		
S.No	*Plant Name*	*F1*	*F2*	*F3*
1	Tulsi (fresh leaves)	2gm	2gm	2gm
2	Ginger	2gm	2gm	2gm
3	Liquorice	5gm	5gm	5gm
4	Fennel	4gm	4gm	4gm
5	Cardamom	3gm	3gm	3gm
6	Clove	2gm	2gm	2gm
7	Peppermint leaves	2gm	2gm	2gm
8	Honey	40%	45%	50%

Evaluation Parameters of the Syrup

- *Colour Examination*

Take 5ml of the syrup F1, F2 and F3 on a watch glass, the watch glass placed against white background in white light. Colour was observed by naked eyes.

- *Odour Examination*

Take 2ml of the syrup F1, F2 and F3 and smelled by individually three times, with time interval.

- *Taste Examination*

Take 0.5 ml of the syrup F1, F2 and F3 and examined on the taste buds of the tongue.

Table 4: Evaluation value of all the formulations

S.No.	*Test*	*Syrup F1*	*Syrup F2*	*Syrup F3*
1	Moisture Content	1.5	1.4	1.39
2	Ethanol soluble extractive	10.45	10.97	11.02
3	Water soluble extractive	11.61	11.89	12.54
4	Colour	Brownish yellow	Brown	Brown
5	Odour	Aromatic	Aromatic	Aromatic
6	Taste	Slightly Pungent	Slightly Pungent	Slightly Pungent
7	pH	6	6.1	6.2
8	Viscosity (centipoise)	494.3	519.5	505.1
9	Specific Gravity	1.178	1.116	1.201

- *pH Determination*

Take 50 ml of the syrup F1, F2 and F3 and pH was measured by using digital pH meter.

- *Viscosity Determination*

The viscosity of each formulation was determined by using Ostwald's viscometer.

- *Specific Gravity*

Pychometer method used for the determination of specific gravity of all three formulations.

Evaluation parameters and their values or observation given in the Table 4.

Colour

The colour of the formulation was found to be Brownish-yellow to brown for the syrup F1, F2, F3.

Odour

The odour of formulation was aromatic for the syrup F1, F2, F3 batches respectively.

Taste

The taste of formulation was slightly pungent for all the three batches.

pH

The ph value of the formulation F1, F2, F3 were found to be 6, 6.1 and 6.2

Specific Gravity

The Specific Gravity of the formulation was found to be 1.116, For the optimized formulation F2. The value was found to be in the range of 1.11-1.20 for all three formulations.

Viscosity

The viscosity of formulation was found to be 519.5 poise for the optimized formulation F2. The value was found to be in the range of 494.3-519.5 poise for all three formulations.

Conclusion

All three formulas' quality control parameters fell within specifications. The prepared syrup's physiochemical qualities, including its colour, odour, pH, taste was all suitable. However, out of three formulations, this one met all the specification and had an appropriate concentration of honey according to IP in addition to being a good preservative. With 40% W/V honey as the cough syrup's base, the current study contributes to the development of an effective and secure herbal cough syrup.

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