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Formulation and Evaluation of Herbal Cough Syrup of Tulsi ny Using Molasses Base

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Abstract

Syrup is generally useful and popular dosage form which is used for the treatment of cough and cold. We prepared the herbal cough syrup by adding Extraction of herbal drugs such as Tulsi, black pepper and Molasses as a base. The herbal cough syrup is formulated by using Extraction and decoction method. Adding the decoction of herbal drugs with base of Molasses is helpful to the formulation for thick and preserve the formulation. That was helpful to increase the shelf life of formulation of herbal syrup.

Keywords: Crumb Rubber, Compressive Strength, Extraction and decoction method,Low Cost, Sustainable, utilization,

INTRODUCTION

Herbal cough syrup was prepared by adding decoction of herbal drugs with Molasses as a base. The herbal cough syrup is formulated by using Extraction method. Mix decoction of herbal drugs with base of molasses helpful to the formulation for thicken and preserve the formulation. That was helpful to increase the shelf life of formulation. The added molasses sweetener can also helpful to increase the palatability of some herbal drugs. Unpleasant taste and odour.[1] Herbal syrup it is a defined as a prepared and combination and concentration decoction with molasses or either some time use alcohol. The base of such syrup is a strong herbal decoction and mixing a decoction with molasses help to thicken preserves the decoction.[2] Herbal plant and formulation are used for many types of disease like cough syrup and other disease. The cough syrup many types of herbal plant are used for Tulsi, Black pepper, Molasses in that whole plant are used for making herbal medicine the many years. Herbal formulation a most commonly used a development as well as developing countries as health care

breathing passge from secretion, irritants, foreign particle and microorganisms.Some of the symptoms of a cough are itchy throat, chest pain and congestion. The repetition of coughing produces inflammation and discomfort, which in turn result in more coughing. Natural product itself or compounds derived from natural products play a major role as drugs or lead molecules for the development of synthetic drugs.[4]

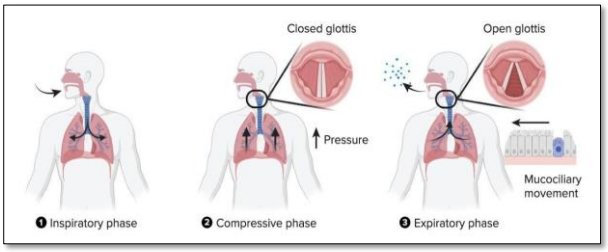

Fig.1:- Phases of Cough

1.1.1. Types of the Cough:

Cough is classified depending upon duration, character and type.

A. Depending upon type:

Cough is classified into two types as dry and wet cough which is depend upon type.
This are identified using signs and symptoms.

1. Dry Cough:

A cough is a reflex action that clears your airway of irritants and mucus. There are two types of cough: productive and nonproductive. A productive cough produces phlegm or mucus, clearing it from the lungs. A nonproductive cough, also known as a dry cough, doesn't produce phlegm or mucus. Many things from allergies to acid reflux can cause a dry cough impact your day-to-day life, especially if it's worse at night. Keep reading to learn more about the possible causes of a dry cough and ways to find relief. [6]

- Productive and effective cough
- Signs associated for dry cough:

1. Sensitive throat
2. Non mucus expelled
3. Short, dry and frequent cough
4. Persistent or constant tickle

2. Wet Cough :

A wet or productive cough is the opposite of a dry cough. It is a cough that brings up fluid, such as phlegm. It can be a sign of a respiratory infection, congestive heart failure, and other conditions. Coughing is a reflex that occurs in response to irritation in the throat or lungs. It Coughs up phlegm

1. Wheezing
2. Chest tightness
3. Difficulty in breathing.
4. Medicine: Expectorant.[7]

1.1.2. Classification of Cough:

1. Acute cough- Not more than 3 weeks duration.
2. Chronic cough- More than 3 weeks.
3. Dry cough- No mucous or secretion.
4. Wet cough- with mucous or secretion.
5. Cough from chest and throat- productive and non-productive.

B. On the basis of duration of action of cough is classified as:

It may be classified into acute, sub-acute and chronic cough depending upon duration

1. Acute cough
2. Subacute cough
3. Chronic cough

1. Acute Cough:

- The cough lasting for less than 3 weeks are categorized under this type.
- Causes for acute cough is due to common cold, URTI, COPD, environmental pollution, and infective bronchitis

2. Subacute Cough:

- The cough lasting for at least the period of 3 to 8 weeks is categorized under this type.

- The respiratory causes are pneumonia.
- Non respiratory causes are GERD and rarely Tourette's syndrome[8,9]

3. **Chronic Cough:**

- The cough lasting for more than period of 8 weeks or more are chronic coughs.
- The respiratory causes are COPD, asthma, lung cancer, tuberculosis and pneumoconiosis[8,9]

1.2. Herbal Cough Syrup:

Herbal cough syrups made from concentrated herbal teas are kept in sugar or honey. Herbal syrups have long Been used to enhance the flavor and shelf life of bitter medicinal plants.

1.2.1. Advantages of Herbal Cough Syrup:

- No adverse effects.
- Readily available.
- Simple to modify the dosage for the child's weight.
- There is no need for nursing care, therefore the patient can take it without help.
- of bacteria, fungi, and mold.[10]
- Low cost.
- Not required prescription.
- Harmless.[11]

Collection of drugs:

1. Molasses:

Synonyms :- Treacle or black treacle

Geographical source :- Molasses is a product of the sugar beet and sugar cane refinement processes. Molasses from sugar cane is preferred for human consumption

Chemical Constituents:- Molasses is rich in vitamins and minerals, including vitamin B6, iron, calcium, magnesium, and potassium.

Fig 2:- Light Molasses

Fig 3:- Dark Molasses

Fig 4 : Blackstrap molasses

It consists of 65 percent sucrose.[13] This types of molasses is used in cookies and other baked goods. When recipe calls for molasses and doesn't specify a type, this is your best bet.[14]

Materials and Methods

Extraction of Molasses:

- The sugar cane stalks are loaded onto conveyer belts and subjected to hot water sprays to remove dirt and other field debris.
- Then, they are passed under rotating knife blades that cut the stalk into short pieces or shreds.
- In the sugar cane processing plant, extraction can be accomplished in one of two ways: diffusion or milling.
- By the diffusion method, the cut stalks are dissolved in hot water. In the milling process, the stalks are passed under several successive heavy rollers, which squeeze the juice out of the cane pulps. [15]
- Strain the sugar cane juice through a cheese cloth or fine sack to remove any large particles.
- Transfer the juice to a large boiler pan. The size of the pan will depend on the amount of juice you have.
- The pan should be at least six inches deep. Place the pan with the juice over a heat source and bring the juice to a slow boil.
- Make sure the heat source is not too high, but kept at a constant and low temperature.
- The temperature is just high enough for the juice to boil. Let the juice boil for about six hours, stirring as it boils.
- Try to skim off any green substance that forms at the top of the boiling juice with a large spoon or molasses strainer.
- Turn the heat off when the molasses turns from green to yellow or when it starts to get thick and small threads appear when stirring.
- Allow the molasses to cool. Boil the molasses a second and third time.
- By the third boil the molasses will be very dark in color. You will not need to boil the molasses as long as the first time.
- Each boiling process you will scoop out the sugar film that forms on the top of the molasses.
- Scoop the hot molasses and place it into jars or cans. Let the molasses cool in the jar, it is easier to work with when hot. If using glass jars then you will need to heat up the jars before filling with the hot molasses, otherwise the hot molasses will crack the glass.[17]

1.3.Extract Preparation

1.3.1. Extraction of Tulsi :

1. 25g of leaves were weighed and placed in the thimble of a Soxhlet extractor.

2. Fill the Soxhlet extractor with 50ml of water and 50ml of ethanol measured using a measuring cylinder.
3. After coupling the device, a condenser unit was linked to an above water tank to collect increasing solvent vapor.
4. The heat source was a heating mantle at 80°C.
5. The solvent evaporated in the distillation path, thimble, and expansion adapter, then condensed in the Soxhlet extractor's condenser unit.
6. The condensed vapor returned to the thimble as liquid droplets, coming into contact with the sample inside.
7. After extraction, the extractor was removed and the extract was collected.
8. After extraction, the liquid was discharged into a condenser to separate solvent from oil extract.
9. The mixture was distilled at 80°C until the Tulsi oil extract was totally solvent-free.

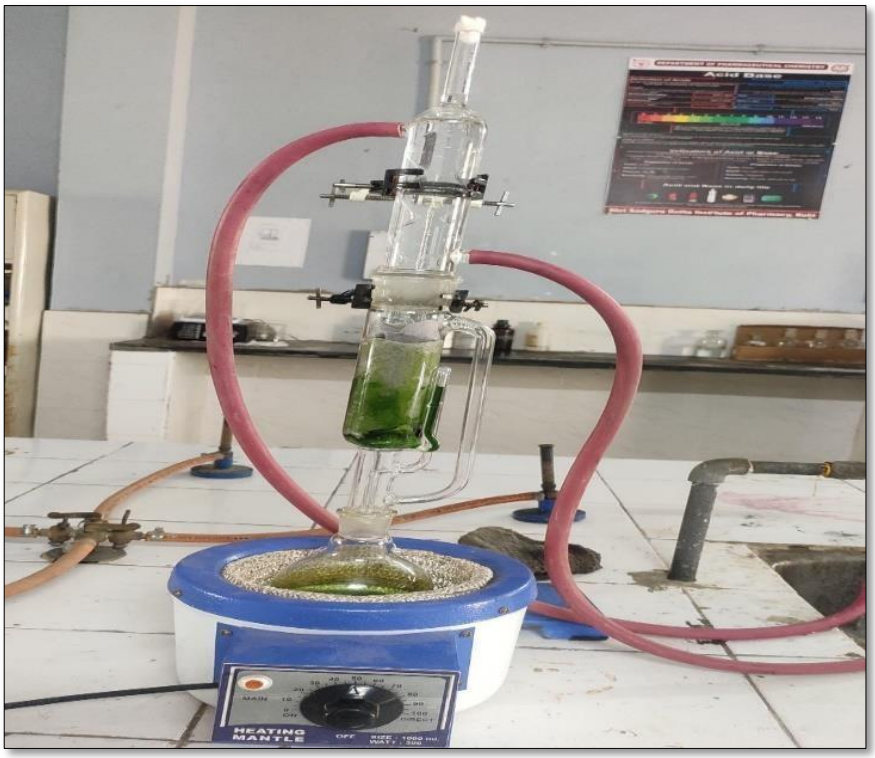

Fig. 5:- Extraction of Tulsi

Extraction of Black pepper :

- Black pepper extract was prepared by using decoction method :-
- Wash and Grind (5 g) black pepper to a coarse powder.
- Powder are mixed with 50ml water
- To prepared final cough syrup macerated Black pepper was mixed with of tulsi extract.
- Attract reflux condenser and boil material carefully by using water bath for 3 hours.
- Boil until total volume become one forth Part of previous the liquid was cooled and filter out.

Fig.6:- Extraction of Black pepper

Fig.7: Extraction of Tulsi, Black pepper and Molasses

Phytochemical Screening

The following methods were used for qualitative phytochemical analysis of oil extracts from Tulsi Extract and Black pepper Extract.

1. Test for Alkaloids

(a) Dragendorff's Test: To 1 ml of the extract, add 1 ml of dragendorff's reagent (Potassium Bismuth iodide solution). An orange-red precipitate indicates the presence of alkaloids.

(b) Mayer's Test: To 1 ml of the extract, add 1 ml of mayer's reagent (Potassium mercuric iodide solution). Whitish yellow or cream colored precipitate indicates the presence of alkaloids.

(c) Hager's Test: To 1 ml of the extract, add 3ml of Hager's reagent (Saturated Petroleum Ether solution of picric acid), yellow colored precipitate indicates the presence of alkaloids.

(d) Wagner's Test: To 1 ml of the extract, add 2 ml of wagner's reagent (Iodine in Potassium Iodide), Formation of reddish-brown precipitate indicates the presence of alkaloids.

2. Test for Glycosides

(a) Legal Test: Dissolve the extract in pyridine and add sodium nitroprusside solution to make it alkaline. The formation of pink red to red color shows the presence of glycosides

(b) Baljet Test: To 1 ml of the test extract, add 1 ml of sodium picrate solution and the yellow to orange color reveals the presence of glycosides.

(c) Keller-Killiani Test: 1 gm of powdered drug is extracted with 10ml of 70% alcohol for 2 minutes, filtered, add to the filtrate, 10ml of water and 0.5ml of strong solution of lead acetate and filtered and the filtrate is shaken with 5ml of chloroform. The chloroform layer is separated in a porcelein dish and removes the solvent by gentle evaporation. Dissolve the cooled residue in 3ml of glacial acetic acid containing 2 drops of 5% ferric chloride solution. Carefully transfer this solution to the surface of 2ml of concentrated sulfuric acid. A reddish-brown layer forms at the junction of the two liquids and the upper layer slowly becomes bluish green, darkening with standing

(d) Borntrager's Test: Add a few ml of dilute sulphuric acid to 1ml of the extract solution. Boil, filter and extract the filtrate with chloroform. The chloroform layer was treated with 1ml of ammonia. The formation of red color of the ammonical layer shows the presence of anthraquinone glycosides.

3. Test for Flavonoids

(a) The drug in alcoholic and aqueous solution with few ml of ammonia is seen in U.V. and Visible light, formation of florescence indicates the presence of Flavonoids.

(b) Little quantity of extract is treated with alcohol, sodium acetate and ferric chloride. A yellow color solution formed, disappears on addition of an acid indicates the presence of Flavonoids.

(c) Shinoda Test: The alcoholic extract of powder treated with magnesium foil and concentrated HCl give intense cherry red color indicates the presence of Flavonoids or orange red color indicates the presence of Flavonoids.

(d) Lead acetate test: To small quantity of extract, lead acetate solution was added. Yellow colored precipitate formation shows the presence of flavonoids.

(e) Sodium Hydroxide test: Addition of large amount of sodium hydroxide to the extract showed yellow coloration, which decolorized after addition of acid, indicates the presence of flavones.

4. Test for Saponins

Take small quantity of alcoholic extract separately and add 20 ml of distilled water and shake in a graduated cylinder for 15 minutes lengthwise. A 1cm layer of foam indicates the presence of saponins.

5. Test for Carbohydrates and Sugars

(a) Molisch's Test: To 2ml of the extract, add 1ml of alpha-napthol solution, add concentrated sulphuric acid through the side of the test tube. Purple or reddish violet colour at the junction of the two liquids reveals the presence of Carbohydrates.

(b) Fehling's Test: To 1ml of the extract, add equal quantities of Fehling solution A and B, upon heating formation of a brick red precipitate indicates the presence of sugars

(c) Benedict's test: To 5ml of Benedict's reagent, add 1ml of extract solution and boil for 2 minutes and cool. Formation of red precipitate shows the presence of sugars.

(d) Iodine Test: To the 3 ml of test solution add few drop of iodine solution. Blue color appears which further disappear on boiling and reappear on cooling.

6. Test for Phenolic Compounds and Tannins

(a) Take the little quantity of test solution and mixed with basic lead acetate solution. Formation of white precipitates indicates the presence of tannins.

(b) To 1 ml of the extract, add ferric chloride solution, formation of a dark blue or greenish black color product shows the presence of tannins.
(c) The little quantity of test extract is treated with potassium ferric cyanide and ammonia solution. A deep red color indicates the presence of Tannins.
(d) To the test extract, add strong potassium disulfate solution, a yellow precipitate indicates the presence of tannins and Phenolic Compounds.

7. Test for Steroids and Sterols

(a) Libermann-Burchard Test: 1g of the test substance was dissolved in a few drops of chloroform, 3ml of acetic anhydride, 3ml of glacial acetic acid was added, warmed and cooled under the tap and drops of concentrated sulfuric acid were added along the sides of the test tube. Appearance of bluish-green color shown the presence of steroids.
(b) Salkowski Test: Dissolve the extract in chloroform and add equal volume of conc. H2SO4 Formation of bluish red to Cherry color in chloroform layer and green florescence in acid layer represent the steroidal components in the tested extract.

Preparation of final cough syrup:

When herbal syrup is prepared by decoction method. Steps are as follows.

- To prepared final cough syrup macerated Black pepper was mixed with of tulsi extract
- Add Molasses extract as flavoring agent and preservative
- Herbal cough syrup was prepared and solubility was checked by observing clarity of solution visually.

6.5. Formulation Table:

6.5.1. Formulation table A:

Sr. No.	Ingredients	Quantity
1.	Tulsi	3ml
2.	Black pepper	2ml
3.	Molasses	25ml

Table No.2:- Formulation A. for 30ml

6.5.2. Formulation table B:

Sr. No	Ingredients	Quantity
1.	Tulsi	7ml
2.	Black pepper	3ml
3.	Molasses	40ml

Table No.3:- Formulation B. for 50ml

6.6. Evaluation Parameters

6.6.1. Pre-formulation study of raw material

1. Moisture content:

- 2gm sample was weighed and taken in petridish.
- Place the petridish in hot air oven at 100C for 1 hr.

- Allowed to cool and weighed the sample again.
- Calculated the moisture content.

2. Determination of ethanol extractive value:

- Taken 5 gm of air dried drug with 100ml of ethanol in a closed flask for 24 hrs.
- Shaken it frequently for 6 hours and then allowed to stand for 18 hrs.
- Then filtered the sample rapidly
- Then 25 ml filtrate was evaporated in petridish.
- Then dry at 105°C and weighed.
- Calculated the ethanol value.

3. Determination of water extractive value:

- Taken 5 gm of air dried drug with 100ml chloroform in 1000ml water (2.5ml of chloroform in 1000ml water) in closed flask for 24 hrs.
- Shaken frequently for first 6 hrs.
- Allowed to stand for 18 hrs.
- Evaporated 25 ml filtrate to dryness in a petridish.
- Dry at 105^0C and weighed.
- Calculated the water extractive value.

6.6.2. Physical Parameters:

1. Colour examination:

2ml of prepared syrup was taken and smelled. Then Odour was observed.

2. Odour examination:

2ml of prepared syrup was taken and smelled. Then Odour was observed.

3. Taste examination:

A pinch of final syrup was taken and examined the Taste of syrup.

6.6.3. Physicochemical Parameters

1. pH determination:

- On a white tile place a clean pH paper strip.
- Drop of the sample on the pH paper using a clean dropper.
- Observe the change in the colour of the pH paper.

Now compare the colour obtained on the pH paper with the colour shades on the standard pH chart.

- Make a note of the pH value obtained.

2. Density examination

- Cleaned the specific gravity bottle.
- The bottle was washed at least two times with Distilled water.
- Measured the weight of empty dry bottle with Stopper (w1).
- The bottle was filled with final syrup and Placed the stopper, wipe out excess syrup from outside the tube.
- Measure the weight bottle with syrup (w2).
- Calculate weight in grams of syrup (w3).

Formula for density :

$$\text{Density of liquid under test (syrup)} = \frac{\text{Weight of Liquid}}{\text{Weigh of equal volume of water}}$$

$$= \frac{W2 - W1}{W3 - W1}$$

- p= Density of Liquid under Test (Syrup)
- W1 = Weight of empty Density Bottle
- W2 = Weight of Bottle + Distilled Water
- W3 = Weight of Bottle + Test Liquid (Syrup)

3. Specific gravity:

- Clean thoroughly the specific gravity bottle with chromic or nitric acid.
- Rinse the bottle at least two to three times with purified water.
- If required, rinse the bottle with an organic solvent like acetone and dry.
- Take weight of empty dry bottle with capillary tube stopper.
- Fill the bottle with distilled water and place stopper; wipe out excess liquid from side tube using tissue paper (w2).
- Weight bottle with stopper and water on analytical balance (w2).
- Repeat the procedure for liquid under test by replacing the water after emptying and drying as mentioned in step 4 to 6.
- Weight bottle with stopper and liquid under test on analytical balance (w3).Now compare the colour obtained on the pH paper with the colour shades on the standard pH chart.
- Make a note of the pH value obtained.

4. Density examination

- Cleaned the specific gravity bottle.
- The bottle was washed at least two times with Distilled water.
- Measured the weight of empty dry bottle with Stopper (w1).
- The bottle was filled with final syrup and Placed the stopper, wipe out excess syrup from outside the tube.
- Measure the weight bottle with syrup (w2).
- Calculate weight in grams of syrup (w3).

Formula for density :

$$\text{Density of liquid under test (syrup)} = \frac{\text{Weight of Liquid}}{\text{Weigh of equal volume of water}}$$

$$= \frac{W2 - W1}{W3 - W1}$$

- ρ = Density of Liquid under Test (Syrup)
- W1 = Weight of empty Density Bottle
- W2 = Weight of Bottle + Distilled Water
- W3 = Weight of Bottle + Test Liquid (Syrup)

5. Specific gravity:

- Clean thoroughly the specific gravity bottle with chromic or nitric acid.
- Rinse the bottle at least two to three times with purified water.
- If required, rinse the bottle with an organic solvent like acetone and dry.
- Take weight of empty dry bottle with capillary tube stopper.
- Fill the bottle with distilled water and place stopper; wipe out excess liquid from side tube using tissue paper (w2).
- Weight bottle with stopper and water on analytical balance (w2).
- Repeat the procedure for liquid under test by replacing the water after emptying and drying as mentioned in step 4 to 6.
- Weight bottle with stopper and liquid under test on analytical balance (w3).

Formula for specific gravity:

Specific gravity of liquid under test (syrup) = Density of Liquid / Density of Water

6. Viscosity examination:

- Cleaned the Ostwald viscometer with warm Chromic acid and if necessary used an Organic solvent such as acetone.
- Placed the viscometer in vertical position on a Suitable stand.
- Filled water in dry viscometer up to mark G.
- The time was counted in second for water to Flow from mark A to mark B.
- This step was repeated at least 3 times to obtained accurate reading.
- Then washes the viscometer with sample liquid and then fill it up to mark A, then observed out the time required for liquid to flow to mark B.

Formula for Viscosity:

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

$$\text{Viscosity} = \frac{\rho_2 t_2}{\rho_1 t_1} \text{ X } \square_1$$

- ρ_1 = Density of Water
- ρ_2 = Density of Syrup
- η_1 = Viscosity of Water (cp)
- η_2 = Viscosity of Syrup (cp)
- t_1 = Mean time of Water from A to B (sec.)
- t_2 = Mean time of Syrup from A to B

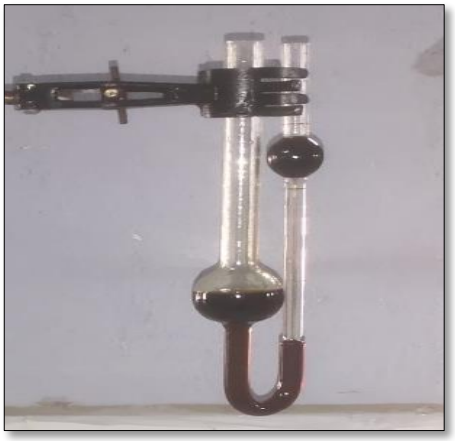

Fig.08 :- Ostwald Viscometer

7. Stability testing:

1. Stability testing of the prepared herbal syrup Was performed on keeping the samples at Accelerated temperature conditions.
2. The final syrup was taken in culture tubes.
3. Then kept at accelerated temperature at 4°C, Room temperature and 47°C respectively.
4. The samples were tested for all the Physicochemical parameters (colour, odour, Taste) turbidity and at the interval of 24 hr, 48 Hr and 72 hr to observe any change[24]

8. Microbiological Control Testing :

In the laboratory, nutritional agar was made aseptically by dissolving 28g of dried nutrient agar foundation medium in 800mL of distilled water. The mixture was then boiled in a water bath until the agar melted, after which the solution was sterilized in an autoclave. The prepared medium was used for plate preparation throughout the study. Staphylococcus aureus bacteria were cultivated on nutrient agar to determine microbial growth in the gel.

The following testing methods were employed for microbial growth in herbal extract:

1. Negative control testing: Nutrient agar was weighed, dissolved in distilled water, and placed into a petri dish.

2. Positive control testing: Positive control testing involved weighing and dissolving nutrient agar in distilled water, then adding bacteria to the medium and pouring it into a petri dish.

3. Testing with extract: Nutrient agar was weighed and dissolved in distilled water before adding face wash to the medium and pouring it into a petri plate.

These methods were used to assess microbial growth with Staphylococcus aureus as the bacteria and nutrient agar as the culture medium.

9. Result and Discussion

9.1. Phytochemical parameters of Tulsi and Black pepper Extract :

The polyherbal cough syrup contain the phytoconstituents that were present in the raw material also comes in the final syrup.

Sr. No.	Chemical Constituents	Test	Tulsi	Black pepper
1.	Alkaloid	Mayer's Test	Positive	Positive
2.	Glycoside	Keller-Killiani Test	Negative	Positive
3.	Flavonoid	Lead acetate test	Positive	Positive
4.	Saponins	Foam test	Positive	Negative
5.	Carbohydrate	Molisch's Test	Positive	Positive
6.	Tannins	Ferric Chloride	Positive	Negative

Table No 4:- Phytochemical parameters of Tulsi and Black pepper Extract

9.2. Pre formulation of raw materials:

Sr. No.	Test	Percentage
1.	Moisture content	6%
2.	Water extractive test	12%
3.	Ethanol extractive test	30%

Table No.5:- Physicochemical constituents of crude drug

Fig 09:- Moisture content test.

Fig 10:- Ethanol and water extractive test

9.3. Physical Parameters of cough syrup:

Sr. No.	Parameters	F1	F2
1.	Colour	Dark brown	Dark brown
2.	Order	Sweet aromatic	Sweet aromatic
3.	Taste	Sweet	Sweet

Table No.6 :- Physical Parameters of cough syrup

9.4. Physicochemical Parameters of syrup:

Sr. No.	Parameters	F1	F2
1.	pH	6.8	6.5
2.	Density	1.36 g/ml	1.25 g/ml
3.	Specific gravity	1.35 g/ml	1.24 g/ml
4.	Viscosity	8.56 cp	6.59 cp

Table No.7 :- Physicochemical Parameters of syrup

9.5. Stability testing of cough syrup:

Time Duration (Hours)	**perature (°C)**				
		Colour	**Odour**	**Taste**	**Turbidity**
24Hr	4°C	No Change	No Change	No Change	No Change
	Room Temperature	No Change	No Change	No Change	No Change
	47°C	No Change	No Change	No Change	No Change
48Hr	4°C	No Change	No Change	No Change	No Change
	Room Temperature	No Change	No Change	No Change	No Change
	47°C	No Change	No Change	No Change	No Change
72Hr	4°C	No Change	No Change	No Change	No Change
	Room Temperature	No Change	No Change	No Change	No Change
	47°C	No Change	No Change	No Change	No Change

Table No.8 :- Stability testing of cough syrup

9.6. Microbial Control Test:

Sr. No.	Method	Result
1.	ıtive Control Testing (Nutrient Agar)	No Growth
2.	Positive Control Testing (Nutrient Agar + Bacteria)	Growth occurrence

3.	Testing With extract (Nutrient Agar + Extract)	No Growth

Tablet No.9 :- Microbial control Test

9.6.1. Formulation A

Sr. No.	Zone of Inhibition	Area
1.	20mm	314mm^2
2.	24mm	452.16mm^2
3.	29mm	660.18mm^2

Table No.10:- Formulation A

9.6.2. Formulation B

Sr. No.	Zone of Inhibition	Area
1.	10mm	78.5mm^2
2.	15mm	176.62mm^2
3.	21mm	346.18mm^2

Table No.11:- Formulation B.

Fig:- Formulation A

Fig.14:Formulation B

CONCLUSION

The aim of this project was to formulate and evaluate herbal cough syrup. The present study helped us to understand what actually cough means, what are different types of coughs, factors responsible for causing cough. Herbal treatments for cough were studied briefly. As the study shows that the herbal treatment is more beneficial than that of allopathy treatment which uses standard drugs for treatment as Herbal drugs have less or no side effects. Herbal treatments are more preferred widely.

Herbal drugs are easy to available than that of prescribed drugs. This study helps us to understand cough and measures to be taken in order to avoid cough. The pre-formulation studies of all three formulations were within specification. Three formulations were prepared and evaluation test such as colour, odor, taste and pH were performed. The present study will help us to understand effectiveness of herbal cough syrup compared to chemical- based syrups.

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