WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 11, 1585-1601. Research Article ISSN 2277–7105

FORMULATION AND EVALUATION OF HERBAL COUGH SYRUP

Dr. Balakrishna Tiwari[1*], Suraj Ram Mashale[2], Abhilasha Ganesh Korke[3] and Samruddhi Girish Kulkarni[4]

[*1]Principal, Department of Pharmaceutical Chemistry, Amepurva Forums Nirant Institute of Pharmacy, Solapur.

[2]Assistant Professor, Department of Quality Assurance, Amepurva Forums Nirant Institute of Pharmacy, Solapur.

[3,4]Student, B. Pharm Final Year, Amepurva Forums Nirant Institute of Pharmacy.

Article Received on
10 April 2025,

Revised on 30 April 2025,
Accepted on 20 May 2025

DOI: 10.20959/wjpr202511-36941

***Corresponding Author**
Dr. Balakrishna Tiwari
Principal, Department of Pharmaceutical Chemistry, Amepurva Forums Nirant Institute of Pharmacy, Solapur.

ABSTRACT

Coughing one of the most prevalent issues that everyone faces is this one. Wet cough and dry cough are the two types of coughing. There is cough secretion or mucus in a wet cough, but there is neither in a dry cough. The syrup is the most often used and well-liked dose form for treating colds and coughs since it makes patient compliance easier. Honey and unprocessed medicines such as hibiscus and tulsi or cinnamon were the main ingredients of the herbal cough syrup. Nowadays, syrup is utilized to cure may ailments and alleviate sickness symptoms. Because of the numerous stress-related conditions and other oxidative reactions that occur in the body, which result in the generation of free radicals, the antioxidant syrup is used to treat cancer. The formulation was tested for PH, viscosity, density, and stability, among other parameters, on a laboratory scale. It was found that the formulation was stable and appropriate for usage as a cough treatment. Even at the lowest dosage, it was shown that the herbal formulation's antitussive effectiveness was noticeably better than that of the prescription drug. It relieves coughs more quickly and effectively than solid dosage forms, and it is also easier to administer. The process of making cough syrups was covered.

KEYWORDS: Cough, dry cough, wet cough, herbal syrup, herbal formulation, maceration extraction, herbal treatment, evaluation.

INTRODUCTION

Herbal saccharinity is defined as a set admixture and concentrated decoction made with honey, sugar, or sometimes alcohol.[4] Herbal factory and expression are used for numerous types of complaint like cough saccharinity and other complaint. The cough saccharinity numerous types of herbal factory are used for hibiscus flower, Tulsi, Cinnamon, honey in that whole factory are used for making herbal drug the numerous times.[18] Herbal remedies are one of the most extensively used forms of healthcare in both developing and developed nations.[16] The cough syrup medication is a liquid dose form that is used in oral liquid pharmaceuticals. Its basic simplicity of administration has been confirmed for individuals who have trouble swallowing solid prescription dosages. A concentrated mixture of honey and purified water is called syrup.[1] The syrup may or may not contain a combination of flavoring agents or medication. Flavored or non-medicated syrup is defined as syrup that contains a flavoring component but no medication.[5] Medicated syrups, including flavored syrups, are commonly employed as a carrier for the unpleasant test results of medicine.[19] They are frequently prone to bacterial infections due to the high concentration of syrup. Apply as a preservative.[6] Compared to tablets and capsules, syrups are easier to swallow, making them a popular delivery method for anti-tissue medications. This drug is promptly observed. There are similar synthetic cough medicines that have a number of negative effects. In order to demonstrate that violet herbal cough syrup contains natural ingredients without any negative effects, the current study was expanded.[7] Natural therapy is a safe and effective treatment that general health professionals find difficult to obtain. In many cases, allopathic medical products have not been well examined and are typically sold without any information regarding their negative effects or mode of action.[22] However, the use of supplementary medicines can occasionally be beneficial, and there is minimal research on the efficacy of some of these medications, which are commonly sold at pharmacies.[8] It takes a combination of scientific acumen and pharmaceutical "art" to formulate liquids and other dosage forms successfully.[9] Tablets and capsules are gradually replacing oral liquid medications because of the more easily occurring adverse alterations in solution.[10] There are still a lot of liquid oral treatments available in the official literature, though. In actuality, it is possible to anticipate that medicines in solution will be absorbed from the GI tract into the systemic circulation more quickly than other oral dosage forms of the same medication.[11] Oral administration is the preferred method of administering Ayurvedic medicines.[12] and the majority of Ayurvedic formulations taken orally fall within the category of liquid drugs or medication combinations. But a natural remedy combination.[13]

Types of herbal syrup

1. Flavored syrup
2. Medicated syrup
3. Artificial syrup.[1]

Advantages of herbal cough syrup

- Absence of adverse consequences
- Not harmless
- Easily accessible
- Easily modify the dosage based on the child's weight
- Liquid dose forms are used for products such as cough medications
- The patient can take it on their own without assistance, and no nursing is needed.
- It is typical for herbs to grow.
- Antioxidant by delaying the oxidation of sugar when it hydrolyzes into dextrose and cellulose.
- Good patient adherence, particularly for young patients, because the syrup is delicious during testing.
- It functions as a preservative by delaying the growth of mold, fungus, and bacteria due to osmotic pressure.[1,2,3]

Material and method of preparation

Following herbal part are used in the formulation of herbal cough syrup.

1. **Hibiscus flower**

Scientific name

Hibiscus rosa-sinensis L.

Family

Malvaceae

Biological source

The dried or fresh flowers of Hibiscus rosa-sinensis or Hibiscus sabdariffa (commonly used in herbal medicine and teas).

Chemical constituents

- Anthocyanins (e.g., delphinidin, cyanidin, hibiscin)
- Flavonoids (e.g., quercetin, gossypetin)
- Organic acids (e.g., citric acid, malic acid, tartaric acid)
- Polysaccharides
- Vitamin C (ascorbic acid)
- Tannins
- Mucilage
- Fatty acids (in seeds).

Uses

1. Antioxidant and anti-inflammatory properties.
2. Traditionally used to treat high blood pressure, fever, and menstrual disorders

2. Turmeric

Scientific Name

Curcuma longa

Family

Zingiberaceae

Biological source

Dried rhizomes of Curcuma longa Linn.

Chemical Constituents

- Curcuminoids (2–5%)
- Volatile Oils (3–7%)

Uses

1. Anti-inflammatory and antioxidant
2. Used in Ayurvedic medicine for treating wounds, skin disorders, and digestive issues
3. Supports liver function and has antimicrobial properties.[2]

3. Clove

Scientific name

Syzygium aromaticum

Family

Myrtaceae

Biological source

Clove is the dried flower bud of the plant Syzygium aromaticum.

Chemical Constituents

Volatile Oil (14–21%)

Eugenol (70–90%)

Uses

1. Acts as a carminative.
2. Used for its antiseptic property.[2]

4. Ginger

Scientific name

Zingiber officinale

Family

Zingiberaceae

Biological source

The rhizome (underground stem) of the plant Zingiber officinale is used.

Chemical source

1. Volatile Oils (1–3%): Zingiberene, β-bisabolene, Camphene, Cineole
2. Non-volatile Pungent Compounds:
   - Gingerols (main active component in fresh ginger).
   - Shogaols (formed from gingerols during drying).
   - Zingerone (formed on heating).
3. Resins, starch, gums, and fatty oils

Uses

1. Used as anti-inflammatory.
2. Used for its antioxidant property
3. Used for its carminative activity.[2]

5. Honey

Scientific name

Mel (general term; actual source varies depending on bee species and floral origin)

Family

Apidae

Biological source

Honey is a sugary secretion deposited by honeybees, primarily Apis mellifera (European honeybee), Apis dorsata (giant honeybee), Apis cerana indica (Indian honeybee), etc. It is collected from the nectar of flowers and stored in honeycombs.

Chemical Constituents

Fructose (32-38%)

Glucose (28-31%)

Sucrose (1-3%)

Uses

1. Used as an antimicrobial and wound-healing agent.
2. Soothes sore throat and cough.
3. Has antioxidant and anti-inflammatory properties[1,2,3]

6. Tulsi

Scientific name

Ocimum sanctum (also known as Ocimum tenuiflorum)

Family

Lamiaceae

Biological source

Biological Source: Dried or fresh leaves and aerial parts of Ocimum sanctum Linn., belonging to the family Lamiaceae.

Chemical Constituents

1. Eugenol – 0.5–1.8% (in essential oil)
2. Methyl eugenol – 0.1–0.8%
3. Caryophyllene – 0.4–0.7%

4. Ursolic acid – 0.2–0.6%

5. Rosmarinic acid – 0.1–0.4%

6. Apigenin, Luteolin, Orientin, Vicenin – trace to 0.1%

7. Tannins, Saponins, Flavonoids – 1–3% (combined)

Uses

1. Antimicrobial: Effective against bacteria, viruses, and fungi.

2. Anti-inflammatory: Reduces inflammation and pain.

3. Antioxidant: Neutralizes free radicals, protecting cells.[1,2]

7. Cinnamon

Scientific name

Cinnamomum verum

Family

Lauraceae

Biological source

Dried inner bark of the plant Cinnamomum verum (or other species like Cinnamomum cassia, C. burmannii, etc.)

Chemical Constituents

Cinnamaldehyde (60–80%)

Eugenol (5–10%)

Coumarin (0.4–5%)

Linalool (2–5%)

Cinnamic acid (1–5%)

Uses

1. Used as expression.

2. Used as antimicrobial.

3. Used for its anti-inflammatory activity[1,2,3]

Formulation table

Three formulation of herbal cough syrup were prepared as shown in table

Sr.no		Ingredients			Quantity
		F1 (10ml)	**F2** (30ml)	**F3** (50ml)	
1	Hibiscus flower	2ml	6ml	10ml	Antitussive
2	Turmeric	1ml	3ml	5ml	Antiviral
3	Clove	0.6ml	1.8ml	3ml	Antimicrobial
4	Ginger	1ml	3ml	5ml	Anti-inflammatory
5	Honey	4ml	12ml	20ml	Cough Suppressant Preservative
6	Tulsi	1ml	3ml	5ml	Antimicrobial
7	Cinnamon	0.4ml	1.2ml	2ml	Expectorant

Method of preparation of herbal cough syrup

Preparation of extract by Maceration method

Herb collection

↓

Cleaning and Sorting

↓

Drying

↓

Grinding into powder

↓

Maceration

Mix herbal powder with appropriate solvent (e.g water, ethanol)

Allow to stand for a specified duration (e.g 24-72 hours) with occasional stirring

↓

Filtration

Filter the macerated mixture to remove solid residues

↓

Concentration (if required)

Evaporate excess solvent under reduced pressure or gentle heating

↓

Preparation of syrup base

Prepare honey solution or other syrup base ingredients

↓

Incorporation

Mix the concentrated herbal extract with the syrup base

↓

Addition of preservatives and flavoring agents

Add natural or synthetic preservatives, and adjust flavor

↓

Homogenization

Ensure uniform dispersion of the extract in the syrup base

↓

Quality control testing

Evaluate PH, viscosity, microbial load, etc.

↓

Packaging and labeling

↓

End/Product ready

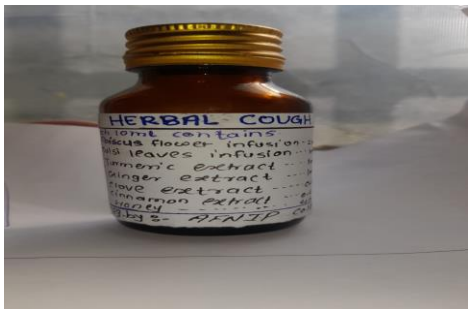
Preparation of extract

Preparation final cough syrup

To prepared final cough syrup 45% of honey was mixed slowly side by side continous stirring in solution

↓

Herbal cough syrup was prepared and use for cough.



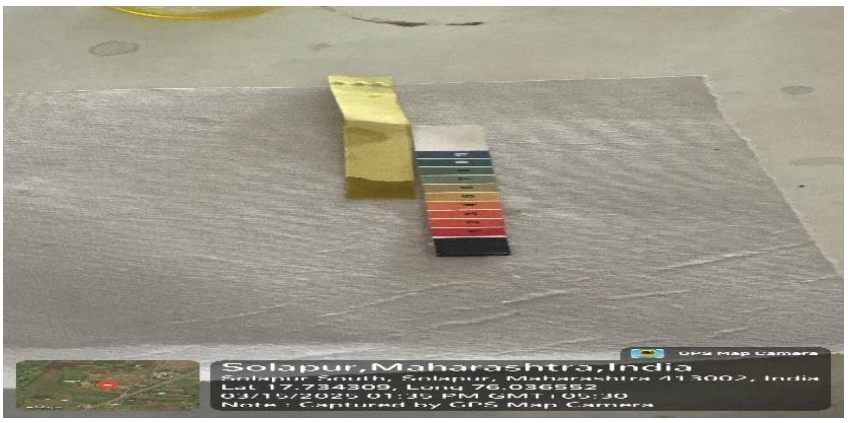
Herbal Cough Syrup

Test	Procedure
Color	• 5 ml of prepared syrup was taken on a watch glass • Watch glass placed against white background in white tube light. • Color was observed by naked eyes
Odour	• 2ml of prepared syrup was taken & smelled by individually. • Time interval between 2 smelling was 2 minutes to nullify effect of previous smelling.
pH	• 10ml of prepared syrup taken in 100 ml of volumetric flask. • Make up volume to 100 ml with dist, water. • Sonicated for 10 minutes. • pH was measured by using digital pH meter.
Taste	• A pinch of final syrup was taken and examined on taste buds of the tongue.
Viscosity	• The viscosity of formulation was determined by using

	Ostwald's U-tube viscometer
Density	• Density of formulation was determined by using density

- **Evaluation table**

Test	Observed
Colour	Brown
Odour	Aromatic
Taste	Sweet
pH	6
Viscosity	4.96 cp
Density	1.25 g/ml



PH test.

Viscosity test.

RESULT AND DISCUSSION

The study's findings indicate that the herbal formulations made have antitussive properties. The herbal cough formulation's ingredient was chosen because of its documented ability to both prevent and treat cough problems. All physical requirements are met by the produced syrup, which also exhibits strong antitussive properties.

The syrup consists of Hibiscus flowers, turmeric, clove is commonly used to treat asthma and cough. Cinnamon are used to mucus. Tulsi are also used for antiviral and antimicrobial.

Anti-microbial test Passed.

CONCLUSION

All of these formulations' formulation experiments fell inside the parameters. The resulting syrup's physiochemical characteristics, including color, taste, odor, pH, and viscosity, were also suitable. However, the formulation met all requirements, including having an appropriate honey concentration in accordance with Ip and a good preservative. Using 45%w/v honey as the base for cough syrup, the current study aids in the development of safe and effective herbal cough remedies.

REFERENCES

1. Devkar M J, Shaikh S S. M., Jadho AG, J Sanap, Patil PA, Formulation and Evaluation of Herbal Syrup, Asian Journal of Pharmaceutical Research and Development, 2021; 9(3): 16-22. DOI: http://dx.doi.org/10.22270/ajprd.v9i3.955
2. Panda P, Sahu A, Formulation and Evaluation of Herbal Cough Syrup, Asian Journal of Pharmaceutical Research and Development, 2023; 11(2): 28-33. DOI: http://dx.doi.org/10.22270/ajprd.v11i2.1234
3. Akanksha Pardhi, et al., FORMULATION AND EVALUATION OF HERBAL COUGH SYRUP. Int. J Med. Pharm. Res., 2025; 6(1): 282- 292.
4. Define herbal syrup Indian pharmacopoeia.
5. C.G.BUTLER .C.O. JefferandH. Kalmsted Experimental S and D.B.V college Received 4 Jully 1943.

6. Kaushik, A; Chavhan, v: Sudha, Formulation and Evaluation of herbal cough syrup, EJPMR, 2016; 3(5): 517-522.
7. Akula, N.P. subramanyam. K. V. Sanym. p, Karthik.s.Madhuri, J. Mounika, G and Tamkanat. f 2017.
8. Mujawar, F.P.Patil, M.K, sawale. J Formulation and Evaluation of herbal cough syrup form some Herbs used as expectorant WJPPS, 2016; 2(5): 3848-3833.
9. Lachman L. Lieberman HAKanig JL. The Theory and practice of Industrial pharmacy.3rdedition Bombay; Varghese publishing House, 1987; 457.
10. Carte SJ. Dispensing for pharmaceutical students. 12th edition. New Delhi; CBS publisher and Distributors, 2000; 67.
11. Ghiware N.B; Gattani S.G, Chalikwar SS. Design Development and Evaluation of Piper nigrum and Nyctantherarbortristis. International journal of Pharma Jech Research, 2010; 2(1): 171-176.
12. Ansel HC Allen LV. Pharmaceutical dosage form and drug delivery systems. 7th edition Lippincott, 2000; 347-356.
13. Stability Testing for new Dosage forms QIC. (TCH), International conference on Harmonization 1996.
14. A.V. Sharma and p.v Sharmaflavouring agent in pharmaceutical formulations a overview article Ancient science of life.
15. EizbietaHazar and Alicjawodinika a determination of ethanol content in medicated syrup by static headspace Gas Chromatography Received by 2013.
16. A Text Book of Pharmacognosydr.c.kKokate, s. b Gokhale, A. Purohit by eight addition a drug pudina page no. 9: 102.
17. A Text Book of Pharmacognosy Dr. C. K.kokateS.B Gokhale A.P Purohit by eight addition a drugTulsi Page no. 9. 82.
18. A Text Book of Pharmacognosy DrC.K.KokateS.B Gokhale A.P. Purohit by eight addition a drug cinnamon Page no. 9. 118.
19. A Text Book of Pharmacognosy DrC.K.KokateS.B.GokhaleA.P.pirohitby eight addition a drug Honey Page no. 9. 166.
20. Azwanida NN faculty of Agriculture food and Rural Development AFRD by a Received 11 June 2015.
21. Nambiar V.S and Metala H potential functions of lemon Grass cymbopogoncitratus in Health and Disease IJPBA, 2012; 1035-1043.

22. AnkushGanpatPatil. KavalyaGajananMirajakar. Somesh SS Shintre pharmaceutical department (aoverview of innovative science and Research Technology date 6 june 2020.
23. Thomsen. M. PhytochrapyDesk reference Michael Thomsen 2005.
24. Swain Pramod Kumar, and NayakDurgaprasan. International journal of Ayurvedic medicine, 2013; 4(4): 374-378.
25. More NH and Hajare AA practical physical pharmacy 3rd ed 2016. Career publication 12, 13, 142.
26. Hossain.M. Tand Hoq M. O Therapeutic uses of cinnamon AJAMBR, 2016; 156-163.
27. Dr. Javesh. K. Patil, Dipali M. Mali and Komal.R.Jain. formulation and Evaluation of herbal cough syrup word Journal of pharmaceutical Research article on 13/4/2019.
28. Maity. T. K. Mandal SC, pal M. Assessment of Antitussive activity of ovimansactumfood extract, Indian, Nal prod., 2004; 20(2): 23,8.
29. Sampath Kumar K. P. Debijit, B. C, Tiwari P andKharel, R(2010) Indian traditional herbs AdhatodoVacica and Medicinal application JOCPR, 2040-2045.
30. Anu Kaushik Vivek, Chauhan and Dr. Sudha formulation and Evaluation of herbal cough syrup. European Journal of pharmaceutical and medical Research, 2016; 3(5): 517.522.
31. https://theherbalacademy.com/herbalsyrup.
32. Nancy choi MD, Tim Newman, "All about Coughs and their causes", 2017.
33. Sultana S, Khan A, Safhi M. M and Alhazmi H.A, “Cough Suppressant Herbal Drugs: A Review”, International Journal of Pharmaceutical Science Invention, 2016; 5(5): 15-28.
34. Abdul Aziz, Khan I. A, Aqsa Afza, Munawar S.H, “Formulation and Evaluation of HerbalAntitussive Syrup of Methanolic Extract of Lycopus Europaeus in Mice”, American Journal of Pharmacy and Health Research, 2013; 1(3).
35. Thompson M, Vodicka TA, Blair PS, Buckley DI, Heneghan C, Hay AD, “Duration of symptoms of respiratory tract infections inchildren: systematic review”, BMJ, 2013.
36. Ken Harris, “When a cough may be more than just a cough", OSF healthcare, Jan 2021
37. Patil A.G, Mirajakar K J, Savekar P.L, Bugaditkattikar C.V, Shintre S.S, “Formulation and Evaluation of Ginger Macerated Honey Base Herbal Cough Syrup”, International Journal of Innovative Science and Research Technology, 2020; 5(6): 582-588.
38. Herbycin, Types of Coughs, April, 2020
39. Kalpesh B Vaishnav, “Diagnostic Approach to Cough”, Supplement to Journal of the Association of Physicians of India, 2013; 61.
40. Kathleen Kenny, “Cough: Navigating the Classifications”, Pharmacy Times, 2015; 81(11): 10. Sharma S, Hashmi M. F, Alhajjaj M.S, "Cough", Stat Pearls publishing, 2021

41. Francine Kauffmann, Raphaelle Varraso, “The epidemiology of Cough”, Pulmonary Pharmacology and Therapeutics, 2011; 24: 289-294.
42. Carroll, Thomas L., Chronic Cough, 2019 https://en.m.wikipedia.org/wiki/Cough
43. Abiodo Akanmode, “Cough pathophysiology”, Creative commons Attribution/Share-Aikelicense, 2020.
44. G Sant Ambrogio, J Widdicombe, “Reflexes from airways rapidly adapting receptors", National library of Medicine, 2001.
45. Mohammad Ali, Pharmacognocy and phytochemistry, CBS Publisher and Distribution, New Delhi, First edition 2007, reprint-2018; 432-434 And 454-457.
46. A.N. kalia, Textbook of Industrial Pharmacognocy, CBS Publication New Delhi, first edition 2005, reprint 2017; 238-239.
47. https://www.ijrpc.com/files/29-01-20/01.pdf
48. Vikash Sharma, saurabhsingh, Arushi Dixit and Alka Saxena, “Formulation and evaluation of herbal cough syrup from seeds extract of hedge Mustard International Journal of research pharmacy and chemistry ISSN: 2231-278.
49. Tanuja Nesari, B. K. Bhagwat, Jasmin Johnson, Narenda S. Bhatt, and Deepa Chitre, “Clinical Validation of Efficacy and Safety of Herbal Cough Formula: Study of Herbal Cough Syrup”, Journal of Herbal Pharmacotherapy, 1-12.
50. Ankush Ganpat Patil, Kaivalya Gajanan Mirajakar, Laxman Savekar, Chetana V. Bugadikattikar, Somesh S. Hintre. “Formulation and evaluation of ginger macerated honey base herbal cough syrup”. International Journal of Innovation science and research technology ISSN No- 2456-2165.
51. More, Shraddha M. Jain. “Formulation and evaluation of herbal syrup”. World journal of pharmaceutical research volume, 8: 1061-1067.
52. Vikash Sharma, saurabhsingh, Arushi Dixit and Alka Saxena. “Formulation and evaluation of herbal cough syrup from seeds extract of hedge Mustard”, International Journal of research pharmacy and chemistry.
53. https://search.app/7FnHPju2YwxAvgxq7
54. https://www.google.com/gasearch?q=cinnamon%20powder&udm=2&source=sh/x/gs/m2/5#vhid=STuy8-dUlHCJ7M&vssid=mosaic
55. https://www.google.com/gasearch?q=clove%20powder&udm=2&source=sh/x/gs/m2/5#vhid=kBklfx_tGnmx8M&vssid=mosaic
56. https://www.google.com/gasearch?q=ginger%20powder&udm=2&source=sh/x/gs/m2/5#imgrc=fAbkYA2lGMOMAM&imgdii=h8y28JYpIwqFHM

57. https://www.google.com/gasearch?q=tulsi%20leaves&udm=2&source=sh/x/gs/m2/5#imgrc=CN-IrApW3Y1WqM&imgdii=I_jMTl5xZR_V2M
58. https://www.google.com/gasearch?q=turmeric%20powder&udm=2&source=sh/x/gs/m2/5#vhid=rogX4kCeeQKB9M&vssid=mosaic
59. https://www.google.com/gasearch?q=honey&udm=2&source=sh/x/gs/m2/5#vhid=AO3Sp_ObpmmGuM&vssid=mosaic