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FORMULATION AND EVALUATION OF POLY HERBAL SYRUPFOR POST-COVID SYNDROME (COUGH)

Parthibarajan R.*, Baskaran V., Lavanya V. S., Prasanth R., Ruthicshaw R., Jeeva V. Ravichandaran S.

Department of Pharamceuticus, P.S.V. Collage of Pharmaceutical Science and Research-Krishangiri, India.

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***Corresponding Author**
Parthibarajan R.
Department of Pharamceuticus, P.S.V. Collage of Pharmaceutical Science and Research-Krishangiri, India.

ABSTRACT

Novel corona virus disease (COVID-19) is a highly transmittable infectious disease caused by the (SARS-CoV-2) virus. Most people who fall sick with COVID-19 will experience mild to moderate symptoms and recover without special treatment. However, some will become seriously ill and require medical attention. Anyone can get sick with COVID-19 and become seriously ill or die at any stage. Cough is one of the most common problems faced by post- covid patients. Syrup is very popular dosage form of cough. The objective of this study is to develop poly herbal syrup for post-covid syndrome (cough) and to evaluate them. In this study the poly herbal syrup are made into 3 different formulation containing honey, sucrose and numerous herbal extraction were done by maceration and decoction method. Quality of final poly herbal syrup was evaluated with different parameters including physical appearance (color, odor, taste) pH, specific gravity, and viscosity. The formulated syrups under gone stability studies in 3 different temperatures (refrigerator, room temperature, elevated temperature) for 1 month, 2 month, 3 month and no changes were observed.

KEYWORDS: COVID-19, Cough, Syrup, Formulation, Decoction, Maceration And Evaluation.

I. INTRODUCTION 1.HERBAL SYRUP[1,2]

Herbal syrup it is defined as a prepared and combination and concentration of decoction with honey, sugar or either some time use of alcohol. The base of syrup is a strong herbal

decoction and mixing with the sugar, honey help to thickens and preserves the decoction. The cough syrup medication is a liquid dosage form use of oral liquid pharmaceutical has been confirmed on basic ease to administration of solid dosage form medication. Herbal plant and the formulation are used for many types of disease like cough and other disease. The herbal formulation is most commonly used as in development, as well as in the developing countries for various health care system.

2. CORONA VIRUS[3,4]

The corona virus disease is highly transmittable and pathogenic viral infection caused by Severe Acute Respiratory Syndrome Corona Virus (SARS- CoV), which is caused global pandemic that led to a dramatic loss of human life worldwide. The corona viruses are group of envelope viruses with non-segmented, single-stranded, and positive-sense RNA genomes. They infecting a variety of economically important vertebrates (such as pigs and chickens), six corona viruses have been known to infect human host and cause respiratory diseases. corona virus belongs to the "corona viridae family", which causes various disease, from the common cold to the SARS and MERS.

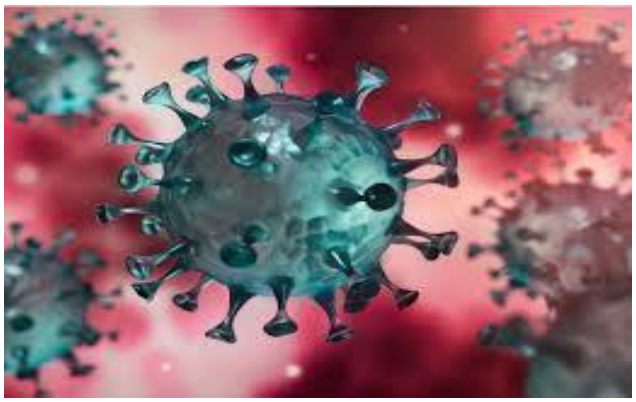


Fig. 1: Corona Virus.

Corona virus represents crown-like spikes on the outer surface of the virus; thus, it was named as a corona virus. The corona viruses are minute in size (65-125 nm in diameter) and contain single-stranded RNA as a nucleic material, size ranges from 26 to 32kbs in length.

3. TYPES[5]

a. Common Human Corona viruses

1. 229E (alpha coronavirus)
2. NL63 (alpha coronavirus)

3. OC43 (beta coronavirus)
4. HKU1 (beta coronavirus)

b. Other Human Corona viruses

5. MERS-CoV (the beta coronavirus that causes Middle East Respiratory Syndrome, or MERS)
6. SARS-CoV (the beta coronavirus that causes severe acute respiratory syndrome, or SARS)

SARS-CoV-2 (the novel coronavirus that causes coronavirus disease 2019, or COVID-19) People around the world commonly get infected with human coronaviruses 229E, NL63, OC43, and HKU1.

4. SYMPTOMS[6]

A wide range of symptoms are found in COVID-19 Patients, ranging from mild/moderate to severe, rapidly progressive, and fulminant disease. The most common symptoms of COVID-19 are:

- Fever,
- Dry cough,
- Fatigue.

Other symptoms that are less common and many affect some patients include:

- Loss of taste or smell,
- Nasal congestion,
- Conjunctivitis,
- Sore throat, SS
- Headache,
- Muscle or joint pain,
- Different types of skin rashes,
- Nausea or vomiting,
- Diarrhea,
- Chills or dizziness.

a. Symptoms of severe COVID-19 disease includes

- Shortness of breath,
- Loss of appetite,

- Confusion,
- Persistent pain or pressure in the chest,
- High temperature (above 30^{o}).

b. Other less common symptoms

- Irritability,
- Confusion,
- Reduced consciousness (sometimes associated with seizures),
- Anxiety,
- Depression,
- Sleep disorders,

More severe and rare neurological complication such as strokes, braininflammation, Delirium and nerve damages.

5. CORONA VIRUS LIFE CYCLE

- Attachment and entry,
- Replicase protein expression,
- Replication and transcription,
- Assembly and release.

6. CLINICAL MANIFESTATION[7]

- Clinical manifestation of COVID-19 infection has similarities with SARS-CoV where the most common symptoms include fever, dry cough, dysphonia, chest pain, fatigue, and myalgia.
- Less common symptoms include headache, dizziness, abdominal pain, diarrhea, nausea, and vomiting.
- Severe complications such as hypoxemia, acute ARDS, arrhythmia, shock, acute cardiac injury, and acute kidney injury have reported among COVID-19 patients.

7. COUGH[8,9]

Cough is a protective reflex that clears the irritants matter and secretions from the respiratory tract. It could be due to the infection, allergy, pleural diseases and malignancy. The cause for the cough should be detected and treated whenever possible. Since it is a protective mechanism, undue suppression of cough can cause more harm than benefits. In some conditions, as in the dry annoying cough, it may be severe no useful purpose and repeated

coughing also causes exhaustion.

As a protective reflex, coughing can be repetitive with the cough reflex following three phases: an inhalation, a forced exhalation against glottis, and a violent release of air from the lungsfollowing opening of glottis, usually accompanied by a distinctive sound.

8. CLASSIFICATION OF COUGH

Table 1: Cough Types and Properties.[10]

S.NO	TYPES OF COUGHS	PROPERTIES
1.	Acute cough	Not more than three week's duration
2.	Chronic cough	More than three week's
3.	Dry cough	No mucous or secretion
4.	Wet cough	With mucous and secretion
5.	Cough from the chest and throat	Productive or non-productive
6.	Paroxysmal cough	Spasmodic and recurrent
7.	Bovine cough	Soundless cough due to paralysis or larynx
8.	Psychogenic cough	Self-conscious activity of the patient to draw attention

9. TREATMENT

Home remedies

- Drinking hot water,
- Drinking herbal tea,
- Taking table spoon of honey with tulsi leaves,
- Gargling with hot water,
- Steaming and using vaporizers.

10. ALLOPATHIC DRUGS

Table 2: Cough drug category and the drugs.[11]

S.NO	DRUG CATEGORY	DRUGS
1.	Central cough suppressants	Codeine, pholcodine
2.	Pharyngeal demulcents	Lozenges, Cough drops
3.	Expectorant	Potassium iodide, ipecacuanha
4.	Bronchodilators	Salbutamol, Terbutaline
5.	Mucolytics	Bromhexine
6.	Analeptics	Doxa pram

11. AYUSH MEDICINE

Table 3: AYUSH Medicine.[12]

S.NO	MEDICINE	COMPOSITION
1.	AYUSH 64	Alstoia scholaris, Pichoriza Kurroa, Swertia Swertiachirata, and caesalpinia crista
2.	Ayurvedic	Suddh suhaga bhasmaSitopaladichurna, Chayawanprash, Divya-swasari-vati, Ashwagandha lehyam.
3.	Yoga and naturopathy	Kapalbhatipranayama, Uttanasana, Nadi shodhan pranayamaBhastrikapranayama, Ujjayi pranayama.
4.	Unani	Joshandah, zinda tilismath, Joshina,
		Saduri syrup, Laung.
5.	Siddha	Nilavembu kudineer, kabasura kudineer.
6.	Homeopathy	Bryonia, belladonna, nuxvomica, ipecac.

II. MATERIALS AND METHODS

1. Instrument used

Table 4: Instrument Names and Suppliers.

SL.NO	INSTRUMENT	SUPPLIER
1.	PH meter	Hasthas scientific instruments
2.	Ostwald viscometer	Hasthas scientific instruments
3.	Heating mandle	Hasthas scientific instruments
4.	Hot plate	Hasthas scientific instruments
5.	Incubator	Hasthas scientific instruments
6.	Reflux condenser	Hasthas scientific instruments
7.	Weighing balance	Hasthas scientific instruments

2. CHEMICALS USED

Table 5: Chemicals used and manufacturer.

S.NO	CHEMICALS	MANUFACTURER
1.	Buffer tablet	Rankem
2.	Sucrose	Nice
3.	Ethanol	CCS

3. HERBAL PLANTS USED

Following herbal plants are used in the formulation of herbal syrup for the treatment.

Table 6: Ingredients used for poly herbal syrup.

S.NO	INGREDIENTS
1.	Adhathoda
2.	Ginger
3.	Clove
4.	Cardamon

5.	honey
6.	Fennel
7.	Cinnamon
8.	Tulsi
9.	Turmeric
10.	Betel leaf
11.	Black pepper
12.	Camphor
13.	Menthol
14.	Calamus
15.	Piper longum
16.	Xanthocarpum
17.	Liquorice
18.	Country borage
19.	Solanum trilobatum

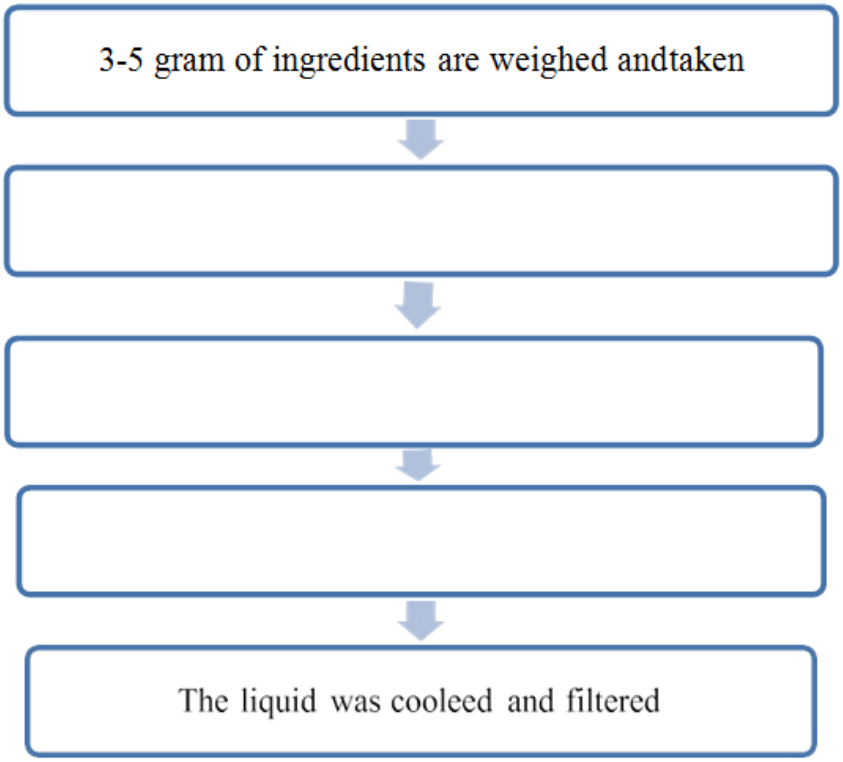
4. Formulation table[13,14,15]

Table 7: Ingredients.

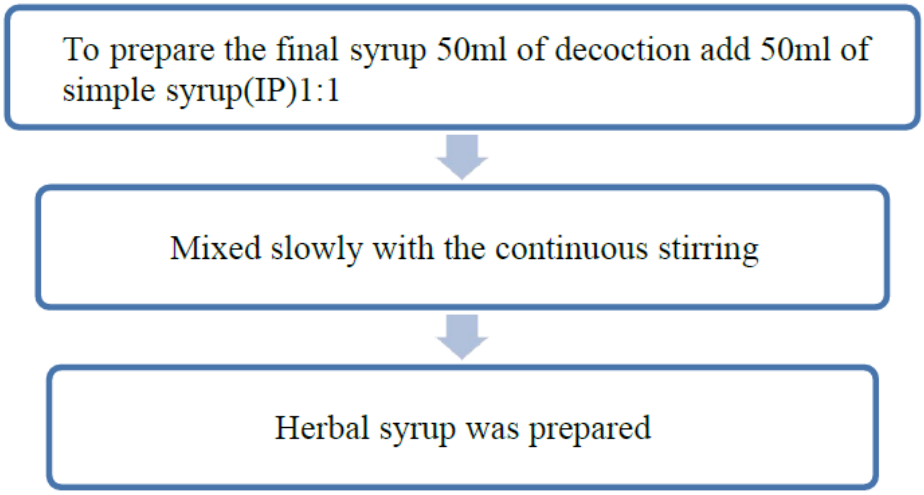
INGREDIENTS	QUANTITY		
	Formulation 1	Formulation 2	Formulation 3
Tulsi	4gm	--	--
Black pepper	4gm	--	--
Camphor	0.03gm	--	--
Menthol	4gm	--	--
Betel leaf	4gm	--	--
Turmeric	4gm	--	--
Calamus	--	5gm	--
P.longum	--	5gm	--
Xanthocarpum	--	5gm	--
Liquorice	--	5gm	--
Country Borage	--	5gm	--
Solanum trilobatum	--	5gm	--
Adhathoda	--	--	5gm
Ginger	--	--	5gm
Clove	--	--	5gm
Cardamon	--	--	5gm
Honey	--	--	50ml
Fennel	--	--	5gm
Cinnamon	--	--	5gm

Formulation of syrup formula

(f1):[13] Method of preparation of decoction

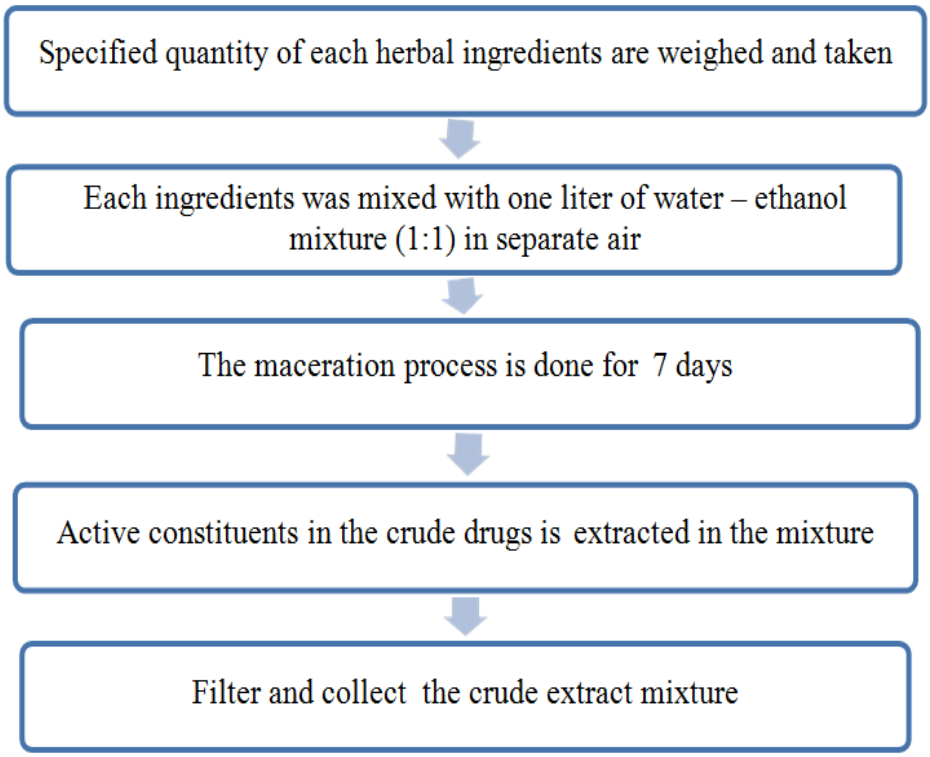


Final herbal syrup

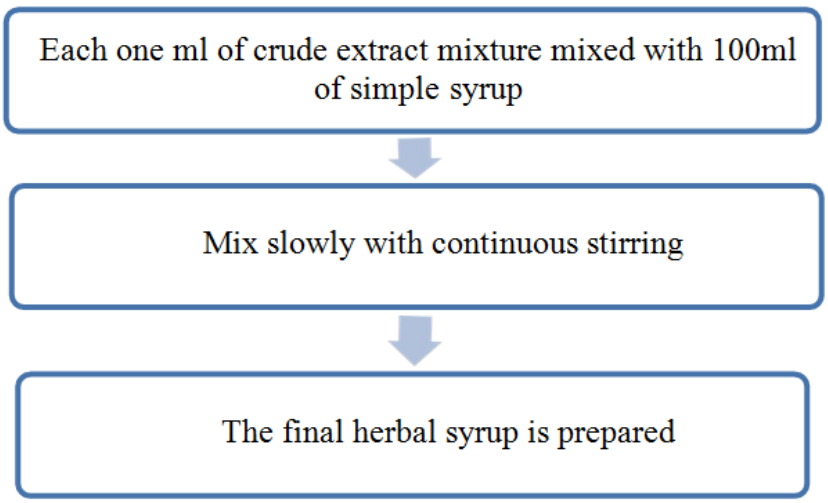


Formulation of syrup formulation

(f2):[14] Method of maceration

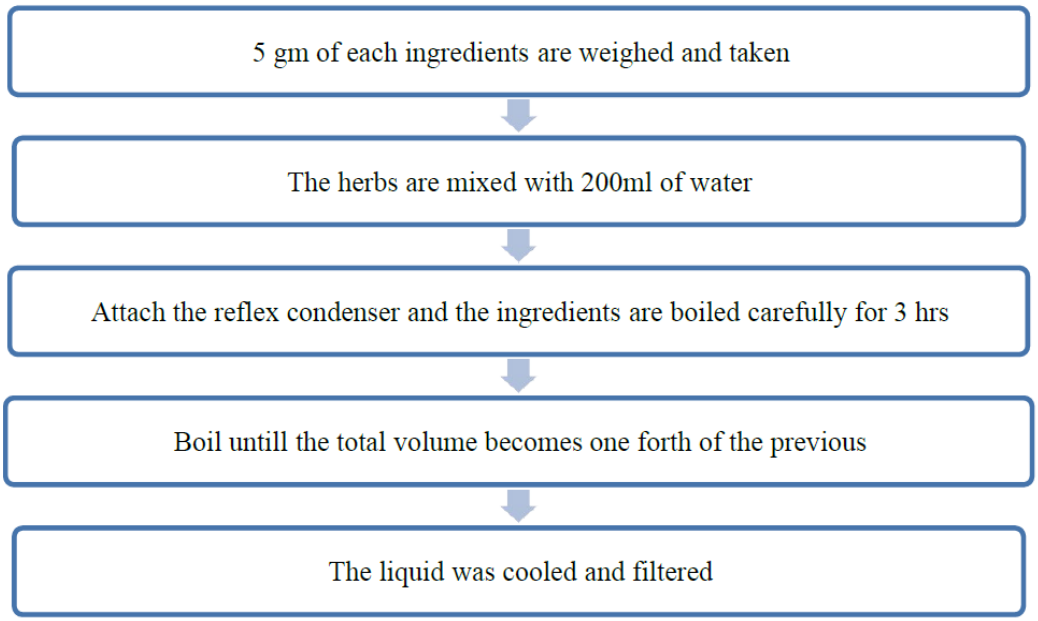


Final syrup

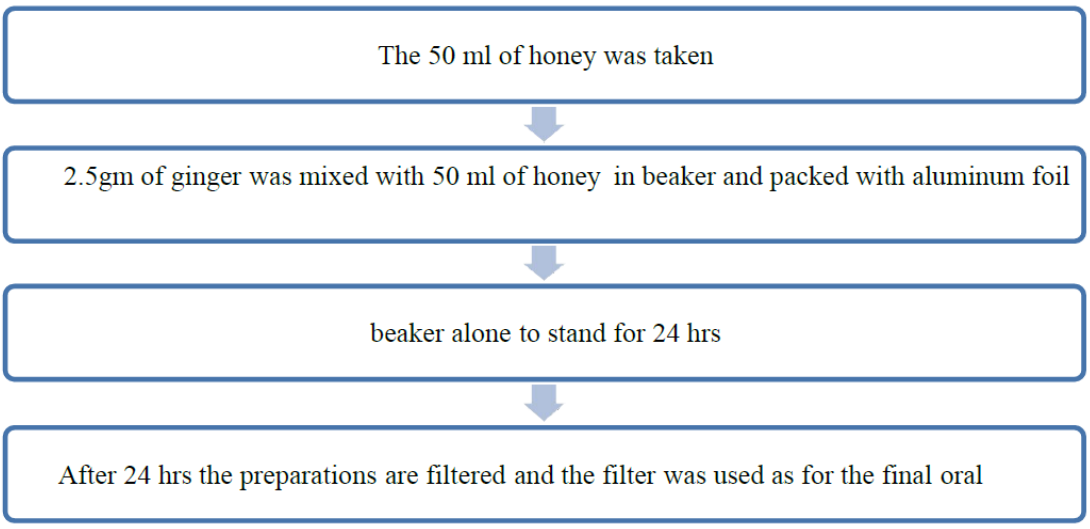


Preparation of the formulation

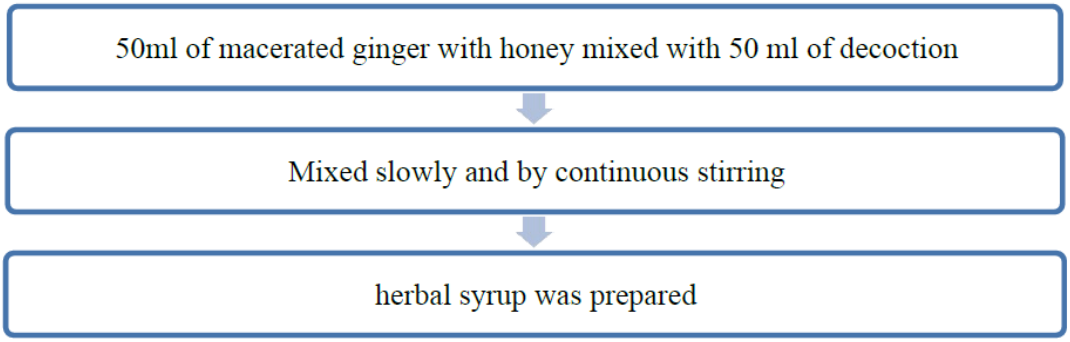
(f3):[15] Preparation of decoction



Preparation of maceration



Final herbal syrup



III. Evaluation[16,14]

- **Examination of colour**

In watch glass was taken 5ml final cough syrup prepration and then it placed against white background in a white tubelight. It was detected for its colour bynaked eyes.

- **Odour**

In that examination the 2ml of cough syrup prepration was smelled separately. The smelling of two separate preprations in between the time interval was kept for 2 min.

- **Taste**

In that pinch of final cough prepration was taken and then observed for its taste on thetaste buds of tounge.

- **pH measurement**

The measurement and maintenance of pH is also a very important step in quality control testing. Generally, there are two different types of methods used in the measurement of pH.

- **Methods for pH measurement**

The simplest and cheapest is to dip a piece of pH paper into the sample. Thepaper is impregnated with chemicals that change color and the color may be compared to a chart supplied with the paper to give the pH of the sample.

If the greatest accuracy is required a pH meter should be used. A typical pHmeter consists of a special measuring glass electrode connected to an electronic meter that measures and displays the pH reading.

- **Specific gravity**

The determination of sucrose concentrations is also very important in quality control testing of syrups. If the concentration of sucrose in the syrup is very high it maycrystallize the syrup and fewer sucrose concentrations give favor for the microbialgrowth.

- **Viscosity measurement**

Viscosity is a property of liquids that is directly related to the resistance to flow. Viscosity measurement is a very important quality control test in the case of syrups and elixirs. Viscosity and consistency directly relate to the stability of solutions. If viscosity increases, then there is a chance of increased instability.

- **Determination of viscosity by Ostwald's viscometer**

The time needed for the test syrup to pass through the viscometer between the two marked lines seen on the instrument was recorded in seconds. The viscosity of the solution is calculated from equation.

$$\eta = \frac{t_1 d_1}{\eta_{t_2 d_2}} \times$$

Where,

Ƞ1 = Viscosity of Sample

Ƞ2 = Viscosity of water

$t1$ = Flow time of sample

$t2$ = Flow time of Water

$d1$ = Density of Sample

$d2$ = Density of water

Accelerated stability studies[17]

Stability testing of the prepared herbal syrup was performed on keeping the sample at accelerated temperature conditions. (Refrigerator condition, room temperature, elevated temperature). The samples were tested for all physi cal parameters like color, odour, taste, pH, viscosity, specific gravity.

Initially the cough syrup (F1, F2, F3) is tested for color, odor, taste, p^H, viscosity and specific gravity. The formulated cough syrup was tested for its color, odor, taste, p^H, viscosity and specific gravity after 1 month, 2 month and 3 month respectively.

Formulation 1 and 2 (F1 & F2) have a slight changes in its physical characteristics. Whereas, the Formulation 3 (F3) does not have any changes in its physical characteristics and it is stable than Formulation 1 and 2 (F1 & F2).

IV. RESULT AND DISCUSSION

Table 8: Physicochemical parameter of developed poly herbal syrup.

SL.NO	PHYSICOCHEMICAL PARAMETER	OBSERVED VALUES		
		FORMULATION F1	FORMULATION F2	FORMLATION F3
1.	Color	Yellow	Light yellow	Yellowish Brown
2.	Taste	Aromatic taste	Aromatic taste	Aromatic taste

3.	Odour	Aromatic odor	Aromatic odor	Aromatic odor
4.	PH	5.25	6.25	5.43
5.	Viscosity	4.359	4.750	8.823
6.	Specific Gravity	1.166	1.160	1.200

Table 9: Stability Studies Through Physicochemical Parameters of Developed Poly Herbal Syrup.

SYRUP	TEMP	COLOR	ODOR	TASTE	PH	VISCOSITY	SPECIFIC GRAVITY
F1	4◦C	NC	NC	NC	5.25	4.35	1.16
	Room temp	NC	NC	NC	5.25	4.35	1.16
	Elevated temp	NC	NC	NC	5.24	4.32	1.14
F2	4◦C	NC	NC	NC	6.25	4.75	1.16
	Room temp	NC	NC	NC	6.25	4.75	1.16
	Elevated temp	NC	NC	NC	6.26	4.74	1.18
F3	4◦C	NC	NC	NC	5.43	8.82	1.20
	Room temp	NC	NC	NC	5.43	8.82	1.20
	Elevated temp	NC	NC	NC	5.43	8.82	1.20

NOTE: NC -No Change

V. SUMMARY AND CONCLUSION

The present study, “Formulation and evaluation of poly herbal syrup for the treatment of post- covid syndrome (cough)” the ingredients of the herbal formulation were selected due to the reported action that play the preservative and curative role in the prevention of cough.

The Poly-herbal syrup formulation was prepared by performing the decoction, maceration, and simple syrup preparation. The formulation studies of all these formulation were within the specifications. Also the physiochemical properties of the prepared syrup like Appearance, Odor, Taste, PH, Specific gravity, Vi scosity, Accelerated Stability Studies were satisfactory but among the 3 formulations (F1, F2, F3) it was within the all specification.

The formulation (F3) it has the proper concentration of honey as per IP and also acts as a good preservative. The herbal product is in high demand, because of the least possibilities of side effect. Thus the present study helps to develop the effective and safe herbal cough with 50% W/V honey as a base of cough syrup. By concluding the formulations, the formulation (F3) is best, effective, safe poly - herbal syrup formulation for the treatment of post -covid syndrome (cough).

REFERENCE

1. Define herbal syrup Indian pharmacopeia.
2. S Satam, R Jain, J Dagaonakar, C Chotalia, A Suthur, and R Joshi, "Evaluation of Clinical Efficacy and Tolerance Of Khasceeze-SF Cough Syrup", International Journal of Pharmaceutical Science and Drug Research, 2011; 3(1): 67-68.
3. Woo PC, Huang Y, Lau SK, Yuen KY, Coronavirus genomics and bioinformatics analysis. Viruses, 2010; 2: 1804-20.
4. Zhong N, Zheng B, Li Y, Poon L, Xie Z, Chan K et al. Epidemiology and causes of severe acute respiratory syndrome (SARS) in Guangdong, People's Republic of china, in February, 2003. The Lancet, 2003; 362(9393): 1353-8.
5. Harapan Harapan, Naoya Itoh, Amanda Yufika, Wira Winardi, Synat keam, Hayphrng Te, Dewi Megawati, Zinatul Hayati, Abram L. Wagner, Mudatsir Mudatsir, Coronavirus disease 2019(C0VID- 19): A literature review, Journal of Infection and Public Health, 2020; 13: 667-673.
6. Almutairi MA, The corona virus disease 2019 (COVID-19) outbreak: Challenge for Pediatric dentistry J. Res Med Dent Sci., 2021; 9: 116-121.
7. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet, 2020.
8. A. Kesari, G. kaushal, T.K. Mohapatra, R.R. Nayak, T. Satapathy, and B. Meher, "International Journal of Universal Pharmacy and Life Sciences" 2011; 1(2): 325-330.
9. Department of Child and Adolescent Health and Development World Health Organization "Cough and Cold Remedies For The Treatment Of Acute Respiratory Infections In Young Children", Switzerland, 2001; 1-33.
10. Karlsson, J.A. The role of capsaicin-sensitive Cfiber afferent nerves in the cough reflex, Pulm. Pharmacol, 1996; 9: 315-321.
11. Padmaja Udayakumar, Medical pharmacology book, CBS publication and Distributors Pvt Ltd, 5thedition, 374-376.
12. https://www.ayush.gov.in.
13. Nudrat Fathima, Faiza Muzaffar, Asama Wazir, Shazia Syed, and Javeria Sheikh, "Formulation and Testing of Herbal Syrup for Cough and Asthma, World Journal of Pharmacy and Pharmaceutical Sciences, 10(2): 1937-1947.
14. Abishek R. Shinkar, "Formulation and Evaluation of Poly-herbal Cough Syrup", International Journal of PharmaO2, Nov-Dec, 2020; 2(6).
15. Anbu jeba Sunilson, K. Anandarajagopal, et al "Antihistaminic evaluation of formulated

Poly herbal cough syrup", Journal of medicinal plants Research, 18 July, 2010; 4(14).

16. Ankush Ganapat patil, Kaivalya Gajanan Mirajakar, Pranav Laxman Savekar, Chetana.V. Bugadikattikar, Somesh. S. Shintre, 'Formulation and Evaluation of Ginger Macerated Honey Base Herbal Cough Syrup', International Journal Of Innovative Science and Research Technology, June, 2020; 5(6).
17. Anu Kaushik, "Formulation and Evaluation Of Herbal Cough Syrup", European Journal Of Pharmaceutical and Medical Research, 2016; 3(5): 517-522.