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A SYSTEMIC REVIEW ON HERBS USED IN COUGH MEDICATION

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Abstract : *Cough refers to a powerful explosive expiration that clears the tracheobronchial tract of fluids and foreign materials. Given the high frequency of cough in both children and adults, the goal of this review paper was to document the plants used to cure and relieve cough in traditional culture and ethnobotany. The issues arising from the use of traditional opioid antitussive medications, such as codeine and codeine-like compounds, to treat cough in a variety of respiratory disorders. Medicinal plants have the potential to provide compounds with strong antitussive efficacy and little side effects. Specification of active compounds responsible for therapeutic action, as well as their measurement in healing medications, are recent advancements in modern phytotherapy, allowing for treatment rationalization, particularly dose and monitoring of unwanted effects. The purpose of this review is to discuss the current state of the plant that is utilized as a source of food, cough-suppressing antitussives and expectorants, as well as their active components.*

Key Words: *Cough, Antitussive activity, Medicinal plants.*

1. INTRODUCTION:

A bacterial, viral, or fungal infection can result in inflammation and fluid in the lungs, which is known as a cough. It can induce fever and make breathing difficult. Your body produces Therapy a cough as a reaction to irritation of the throat or airways.[1] Cough medications is used to not only suppress the cough, but also to relieve the discomfort caused by coughing repeatedly. Extrathoracic symptoms such back pain, headaches, fever, and malaise may warrant symptomatic treatment. Many patients are particularly interested in the latter, and hence seek out an antitussive that can also help them control their cough.Vasaca cough syrup is typically a sweetened beverage that contains cough suppressant Medication. In India, the number of people suffering from asthma is rising daily for a variety of manmade or environmental factor. [3] A chronic lung condition that affects people of all ages is asthma.[4,5]It is brought on by inflammation and constriction of the muscles around the airways, which makes coughing symptoms more difficult to exhale.[6]Thyme, a vasaca plant, has expectorant and antispasmodic properties that help loosen mucus in the bronchi and soothe coughs. Adhatoda vasica leaves are utilised as bronchodialators and expectorants because they contain vasicine, vasicinone, 6-hydroxy vasicine, and adhatodic acid. Eugenol, βCaryophylene, and αHumlene are found in Syzygium aromaticum fruit. Eugenol acetate is used to treat respiratory infections, including asthma, bronchitis, and cough.[7] These are all used to treat coughs, skin infections, and skin eruptions. Coughing may be caused by the respiratory tract.[8] This article's goal is to present, via analysis and research, the role that herbs play in managing cough aversions.

2. LITERATURE REVIEW:

The use of plants for medicinal purposes dates back thousands of years. In classical Chinese medicine, references to medicinal plants for treating respiratory conditions can be traced back to 200 BC. Over time, many of these plant-based remedies have been adopted by other cultures, forming the basis of modern herbal treatments. A significant example is the use of *Papaver somniferum* (opium poppy) from which codeine, a common antitussive agent, is derived. Similarly, *Ephedra sinica* (ephedra) has been used as a source of pseudoephedrine, a decongestant and cough suppressant.

Despite the long history of using synthetic opioid medications like codeine for cough suppression, the associated risks, including addiction and respiratory depression, have led to an increased interest in natural alternatives. Researchers are turning to ethnobotanical knowledge and traditional medicine to identify plants with antitussive effects that can offer safer and more effective treatment options.

Several medicinal plants have been identified for their potential to relieve cough. Among these, *Adhatoda vasica* (Vasaca) has been used for centuries in Ayurvedic medicine due to its bronchodilator and expectorant properties. Other plants such as *Thymus vulgaris* (thyme), *Syzygium aromaticum* (clove), and *Glycyrrhiza glabra* (licorice) are also well-known for their ability to alleviate cough symptoms. Research has shown that these plants contain active compounds such as alkaloids, flavonoids, and essential oils that contribute to their therapeutic effects.

Recent studies on plant-based cough remedies have focused on identifying specific bioactive compounds responsible for their antitussive actions. These advancements in phytochemistry have allowed for a more scientific approach to understanding how medicinal plants work, providing a foundation for their use in modern treatments.

3. OBJECTIVES :

The primary objectives of this review are to:

Document the plants traditionally used to treat cough in various cultures.

Investigate the active compounds responsible for the antitussive and expectorant properties of these plants.

Discuss the potential of medicinal plants as safer alternatives to traditional synthetic cough treatments, particularly opioids like codeine.

Explore recent advancements in the field of phytotherapy, including the rationalization of plant-based treatments and their clinical applications.

Provide recommendations for further research into the efficacy and safety of plant-based remedies for cough.

4. DIAGNOSIS OF COUGH :

These frequently include methacholine challenge testing, sputum (mucus) testing, imaging studies including CT scans or X-rays of the chest, spirometry, and blood tests.[9] It could be a good idea to have the following information ready in advance to aid your doctor in making an accurate Diagnosis.[10] Acute bronchitis and acute viral upper respiratory infections, commonly referred to as the Common cold, are the most frequent causes of acute cough in adults. The aetiology of acute bronchitis is Mostly viral, however in around 10% of cases, bacterial infection is the cause. August 2023.

5. COUGH CLASSIFICATION :

Classifying coughs as wet or dry is the easiest method to understand them. Mucus-filled coughs, or wet Coughs, are frequently happen when one has the flu, a cold, pneumonia, or another sickness. The simplest way to comprehend coughs is to categorise them as either wet or dry. Wet coughs are mucus-filled coughs that commonly occur during colds, flu, pneumonia, and other illnesses.[30] The process of clearing the respiratory system of mucus causes the patient to feel sticky and moist in the back of their

Throat. When a cough doesn't generate mucus, the throat feels dry and tickly.31, 32

Types of 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

Productive and effective cough Signs associated for dry cough.

Sensitive throat

Non mucus expelled

Short, dry and frequent cough

Persistent or constant tickle [11, 12]

2. Wet cough
Non effective and infective cough Signs associated with wet cogh
Coughs up phlegm
Wheezing.
Chest tightness
Difficulty in breathing[13,12]

B. Depending upon duration
It may be classified into acute, sub-acute and chronic Cough depending upon duration [13]
1. Acute cough –
The cough lasting for less than 3 weeks are Categorized under this type. Causes for uses for acute cough is due to common cold,URTI, COPD, environmental pollution, and Infective bronchitis. [14,15]
2. Sub acute cough
The cough lasting for at least the period of 3 to 8 .Weeks is categorized under this type.the respiratory causes are pneumonia, and B.Pertussis infection. Non respiratory causes are GERD and rarely Tourette's syndrome . 14,15
3. Chronic cough
The cough lasting for more than period of 8 Weeks or more are chronic cough. the respiratory causes are COPD, asthma, lung ,Cancer, tuberculosis and pneumoconiosis [14,15]

6. HERBAL TREATMENT OF COUGH

The most preferred treatment for cough is herbal treatment. Herbal formulations are playing major role in improvement of health care sector. The Herbal treatments are used for mild to severe health disorders including, asthma, tuberculosis, cough, pneumonia, kidney diseases, cancer, diabetes, allergies, lung cancer and viral infections [16,17]As stated, to estimate of WHO, there are 80% population even uses herbal medicines for primary health care requirements.
Medicinal herbs have always been used as traditiona primary healthcare agents and especially in Asian countries . [16] Major use of herbal medicines is for health promotion and therapy for chronic, as opposed to condition which are life threatening.Most of the synthetic drug treatment used causes many side effects like vomiting, nausea, sedation, allergies, respiratory tract infections, appetite change, irritability, drowsiness, addiction and excess use can damage organs or parts of organs. [13] In recent years, researchers are mainly focusing on herbal drugs and herbal treatments which have less or have no side effects during and after treatment. [18,19]

CHRONIC COUGH TREATMENT

Upon reviewing the secondary sources excluded from the Cochrane Collaboration, we found one that did not meet the minimal systematic criteria, which we opted not to include[9, 10,11] rather, the CDSR offers a "umbrella review," which is made up of up to 15 SRs and is updated on a regular basis on the Internet, offers a substantial, comprehensive, and ethically sound body of evidence. However, due to the Overall dearth of well-structured trials on pharmaceutical and non pharmacological therapy for Childhood persistent cough, it currently lacks broad therapeutic value. Among these fifteen SRs, one Looked at the management algorithms that were previously discussed in this study.

PHARMACOLOGICAL ACTION :

1.Decongestants
The decongestants found in children's OTC cold medication are either pseudoephedrine or Phenylephrine. Systemic decongestants are adrenergic receptor agonists (sympathomimetics) that produce vasoconstriction within the mucosa of the resipratory tract , temporarily reducing the swelling associated with inflammation of the mucous membranes.[20, 21] Sympathomimetic drugs work on the α Receptors in the vascular smooth muscle causing vasoconstriction and presser effects and on the β-adrenergic receptors in the heart causing increased heart rate and force of contraction.[22,23] because of the cardiac effects, these agents should be used with caution in children with congenital heart disease, hypertension, or cardiac arrhythmias without consulting the patient's pediatric cardiologist. Oral decongestants also should be used with caution in patients with hyperthyroidism and diabetes mellitus.Topical decongestant products are applied topically to the nasal tissues via spray or drops. Topical decongestants stimulate the α-adrenergic receptors in the arterioles of the nasal mucosa, leading to vasoconstriction and shrinkage of nasal tissues.[24, 25] There is minimal systemic absorption if used as directed. The use of isotonic saline nose drops and gentle aspiration can be effective in the temporary relief of nasal obstruction in infants. Also useful is the general humidification of room air. Moisture tends to dilute tenacious nasal mucus so that it is easier to remove.[41]

2.Cough Suppressants

Dextromethorphan is the cough suppressant found in OTC cough medications, and it often is combined with the expectorant guaifenesin. Dextromethorphan, the D isomer of the codeine analogue levorphanol, Acts centrally in the cough center in the medulla to suppress cough. Drowsiness, dizziness, nausea, and Gastrointestinal upset also may be seen with dextromethorphan use. [26,27]Diphenhydramine, an antihistamine, also is marketed as a cough suppressant for the exact mechanism of action of firstgeneration antihistamines antitussive effects is unknown. [28,29]

3.Expectorants

Guaifenesin is the most commonly prescribed oral mucolytic agent as an expectorant in the United States.[33] Its mechanism of action is to reduce the surface tension and viscosity of the mucus, which increases the ease of expectoration. Respiratory mucus removal is facilitated by increased flow of the thinned secretions via ciliary action.[34] Studies on the efficacy of guaifenesin have failed to demonstrate either improved pulmonary function or decreased sputum viscosity. Hence, its clinical usefulness is Questionable.

4.Antihistamines

Diphenhydramine, chlorpheniramine, and brompheniramine are the antihistamines found in children's Cold and allergy formulas.[35, 36]Antihistamines, also known as H1 receptor antagonists, compete for and block the action of histamine at the H1 receptor site on cells in the respiratory tract, gastrointestinal tract, and blood vessels. In the respiratory tract, antihistamines decrease congestion related to allergies.[37.38]Naclerio et al 1988 studied the response of inflammatory mediators to induced viral Infections. All variables except histamine grew stronger in direct relationship with the symptoms as the Cold increased in severity. [39,40] This finding indicates that antihistamines have no role in the treatment of the common cold; they will not shorten the period of symptoms.

5. Antipyretics

Some multi-symptom cold formulas contain acetaminophen or ibuprofen as an antipyretic and analgesic. [42.43] Acetaminophen acts centrally to inhibit the synthesis prostaglandins in the CNS and peripherally to block pain impulse generation. Antipyretic activity is due to its action against prostaglandin E2 in the CNS, which increases in fever.[44, 45]

THE ACTIVE INGREDIENTS IN HERBAL MEDICINES THAT HAVE AN ANTITUSSIVE AND EXPECTORANT EFFECT ARE LISTED BELOW.

1.SAPONIN

Saponins have one of the best-understood modes of action among herbal medications, with the ability to alter cough parameters and phlegm quality.Among herbal remedies, saponins are one of the most well-understood mechanisms of action, with the capacity to modify cough characteristics and phlegm quality.Heterosides with both glycid and Non-glycid components are called saponins.[46,47] The non-glycid component, referred to as the Aglycone, is responsible for its pharmacological effects. When therapeutic doses are taken orally, the Saponins reflexively irritate the vagal nerves.

This leads to an increase in phlegm output in the Airways.Moreover, expectoration is elevated due to inflammation in the cough and respiratory centres. Conversely, larger concentrations of saponins can irritate the stomach and intestinal mucous membranes, Leading to emesis, diarrhoea, and bleeding.[48]

2 FLAVONOIDS

Flavonoids are made up of flavonol glycosides and their aglycones. Flavonoids can reduce the activity of cholinesterase and xanthinoxidase by inhibiting oxidative and reductive reactions. Flavonoids' therapeutic effects are utilised to treat cardiovascular disorders, thromboembolic consequences, and renal ailments combined with antitussive-expectorant activity, are likely to contribute to the positive and beneficial effects.[49]

Flavonol glycosides and their aglycones combine to form flavonoids. Activation can be decreased by flavonoids of xanthinoxidase and cholinesterase by preventing oxidative and

reductive processes. The antitussive-expectorant activity of flavonoids, which are used to treat renal diseases, thromboembolic sequelae, and cardiovascular illnesses, is probably what makes their therapeutic benefits advantageous.

3.ESSENCES

Essences are compounds that include fragrant terpenes. These are volatile substances that directly stimulate cells that secrete, irritating range of bodily tissues, including the epithelium of the airways. They accelerate the ciliary epithelium's motility and have antibacterial and antiphlogistic qualities.

The ingredients in the essence medications are Fructus anisi, Fructus foeniculi, Fructus melissae, H. Seu, and fructus thymi and renal parenchyma damage are some of the side effects that might occur after using aetheric oils. [51]
essences are aromatic terpene-containing molecules. They are volatile chemicals that cause irritation in a variety of tissues throughout the body, including the airway epithelium, by stimulating secreting cells directly. They have antibacterial and antiphlogistic properties while also speeding up the movement of the ciliary epithelium. Fructus anisi, fructus foeniculi, Fructus melissae, H. Seu, and fructus thymi are used to make the essence medications. Nausea, allergic responses, and renal parenchyma damage are some of the side effects that might occur after using aetheric oils.[50]

4. MUCILAGE

The so-called slime medicines are currently very commonly utilised in upper airway inflammations associated with dry irritating cough. These days, upper respiratory infections are frequently treated with the so-called slime Medications.connected to a dry, uncomfortable cough. The most well-known are Folium et Flos althaeae, Folium et Flos malvae, Radix, and Folium plantaginis. Slime medications create a protective layer on the surface of the airway mucous membrane that lessens irritation of the nerve endings of nonmyelinated C-fibers as well as cough receptors (rapidly adapting cough receptors, or RARs) on myelinated vagal nerve fibres. This lessens the irritation of the injured mucous membrane brought on by inflammatory mediators or foreign objects, which results in coughing.[52]

5.GUMS

Gums are translucent, amorphous natural plant hydrocolloids that are typically formed in higher plants as a protective after-injury substance. The herbal gums exhibit a considerable antitussive action. It was investigated the antitussive properties of peach gum. Cough-suppressing activity is likely to be similar to

that of mucilage.[53] Gums are transparent, amorphous hydrocolloids found naturally in plants, usually found in higher plants.as a post-injury protection agent. The herbal gums have a strong antitussive effect. The antitussive qualities of peach gum were studied.Mucilage's cough-suppressing properties are probably comparable.

6. PECTIN

Pectin is described as a stomach mucous membrane protector. The mechanism of pectins' antitussive action is unknown, but under experimental conditions, pectins isolated from citrus fruits (30.2 percent) had an antitussive effect comparable to that of peripherally acting antitussives such as prenoxdiazine (23.7 percent) and dropropizine (27.4 percent) (dose of 50 mg/kg b.w). Table-1, showed list of herbal plants used to treat cough.

Sr.No	Ingredients	Botanical names	Property
1	Ginger	Zingiber officinale	Antioxidant
2	Liquorice	Glycyrrhiza glabra	Anti-inflammatory
3	Tulsi	Ocimum tenuiflorum	Antibacterial
4	Cinnamon	Cinnamomum verum	Expectorant
5	Turmeric	Curcuma longa	Antiviral
6	Cardamom	Elettaria cardamomum	Antimicrobial
7	Honey	Apis mellifera	Cough suppressants
8	Pipermint	Menthe piperita L.	Decongestant
9	Adulsa	Justicia adhatoda	Expectorant
10	Clove	Syzygium aromaticum	Antiviral

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Figure 1: Herbal ingredients used for preparation for herbal cough.

HERBS USED IN COUGH SYRUP [22,23]

1] Vasaka (Adulsa)

Synonyms : Adhtoda, Adulsa
Biological sources : It is dried and fresh leaves of Adhatoda vasica or Malabar nut Family :Acanthaceae.
Chemical Constituents : Vasicine, Vasicinone, 6-hydroxy vasicine, and adhatodic acid , flavonoids, saponins
Uses :
Expectorants , asthmatic patients , cough syrup , used to treat sore throats , it can also help to clear the lungs and improve bronchodilation .

Figure no .2 Vasaka

2] Tulsi

Synonyms : Tulsa , Tulsi
Biologicals sources : Tulsi consists of the fresh and dried leaves of Ocimum species like Ocimum sanctum L. and Ocimum basilicum L.
Family : Labiateae
Chemical Constituents : Phytochemical studies have shown that oleanolic acid, ursolic acid rosmarinic Acid, eugenol carvacrol, linalool, and β-caryophyllene are some of the main chemical constituents of tulsi.
Uses :
Expectorants , In asthmatic patients , Cough syrup , Helps open up the airways and reduce symptoms of asthma ,Tulsi's anti-inflammatory properties which help reduce sinus congestion and ease breathing.

Figure no.3 Tulsi

3] Clove

Synonyms : Lavang
Biologicals sources : Cloves consist of dried flower buds of Eugenia caryophyllus , Eugenol, β-caryophyllene, tannins, flavonoid .
Family : Myrtaceae
Chemical Constituents : Eugenol is the major compound, accounting for at least 50%
Bcaryophyllene
Uses : In asthmatic patients Cough syrup, Nasal decongestant , clove has powerful antibacterial and antiviral properties that help fight infections affecting the respiratory system, such as the common cold and flu.

Figure no . 4 Clove

4] Ginger

Synonyms : Adarak
Biologicals sources : Ginger is a flowering plant whose rhizome of Zingiber officinale .
Family :Zingiberaceae
Chemical constituents :Ginger is abundant in active constituents, such as phenolic and terpene compounds.and paradols. In fresh ginger, gingerols are the major polyphenols.
Uses : Expectorants , Cough syrup , Nasal decongestant,Expectorant , Ginger supports the immune system, helping fight infections that cause coughing.

Figure no .5 Ginger

5] Honey
Synonyms : Madh
Biological sources : Honey is a natural product formed from nectar of flowers by honeybees Apis mellifera.
Family: Apidae
Chemical constituents :Honey contains trace amounts of the B vitamins riboflavin, niacin, folic acid, pantothenic acid and vitamin B6. It also contains ascorbic acid (vitamin C), and the minerals calcium, iron, zinc, potassium, phosphorous, magnesium, selenium, chromium and manganese.

Uses :
Expectorants , Cough syrup , Nasal decongestant , Coats the throat, reducing irritation and soothing coughing , Fights infections that cause coughs, Loosens mucus in the airways, making it easier to clear the throat.


figure no.6 Honey.

6] Turmeric [55,56]

Synonyms : Curcumin
Biologicals sources : Turmeric is a product of Curcuma longa, a rhizomatous herbaceous perennial plant
Family : zingiberaceae
Chemical constituents : Curcumin is the major colouring principal present upto 5% in the rhizomes .miixture of curcumin ,monodesmethoxycurcumin , bisdesmethoxycurcumin
Uses :
fights acne, fades age spots and scars, calms inflammation , fights premature aging, regulates oil production , improves skin textures , promotes hair growth , inhibits the growth of skin cancer


Figure no. 7 Turmeric.

TYPES OF SYRUP :

1] Simple syrup :
When Purified Water alone is used in making the solution of sucrose, the preparation is known as " simple syrup," Simple syrup contains only sucrose (sugar) & Purified water. Example:Sucrose :- 66.7ml Purified water:- 100ml

2] Medicated syrup :
When Syrup contains medicinal substance is know as medicated cough syrup. Example :-Ginger syrup Strong Ginger tincture5 mL Syrup q.s. 100 mL

3] Flavoured Syrup :
Syrups containing flavoring agents but not medicinal substances are called flavored vehicles; Containing Aromatic/ Flavoured – Flavoured syrup
Example: Cherry & Raspberry syrup

7. RESEARCH METHOD :

METHOD OF PREPARATION OF SYRUP

As per (USP) 666.7 g of Sucrose was weighed and added to purified water and heated until it dissolved with occasional stirring. Sufficient boiling water was added to produce 1000 ml.

METHOD OF PREPARATION OF FINAL HERBAL SYRUP

One part of decoction was mixed with five parts of simple syrup (1:5), peppermint oil (0.02%) and required quantity of Sodium benzoate (0.2%) was added to the above mixture (Sodium benzoate) act as a preservative to the above mixture. Solubility was checked by observing the clarity of solution visually. The final herbal syrup was then subjected for evaluation.

PREPARATION OF EXTRACT :

1. Four Syzygium aromaticum were selected, their outer coats removed, and the resulting pieces were mixed to 100 millilitres of, which was thereafter slowly boiled to obtain extract. After filtering, the extract was allowed to cool. One millilitre of the entire extract is measured out.[57]
2. To make extract, about 20g of peel from two oranges was chopped into small pieces and added to 100ml of water. The mixture was then boiled slowly. After filtering, the extract was allowed to cool. A 5 ml solution is measured from the entire extract.
3. To make extract, about 20 gm of vasaka leaves and O.Sanctum leaves were added to 100 ml of water and boiled gradually. After filtering, the extract was allowed to cool.
4. A 5 ml solution is measured from the entire extract . Precisely weigh 33.3 millilitres of sugar.
5. After combining all the extracts, 50 millilitres of syrup were produced .
6. After this syrup was prepared, it was put into an amber bottle, sealed, and kept in a cool place.[15]

PREPARATION OF HERBAL SYRUP :

The simple syrup (66.7% w/v) was prepared as per Indian Pharmacopoeia. 200 mg of each extracts of adhatodavasica, Zingiber Officinale.and 400 mg of each extracts of O.sanctum Syzygium aromaticum,Honeywere dissolved in simple syrup I.P. and the volume was made up to 100 ml and finally preservatives was added.[58]

METHOD OF PREPARATION OF SYRUP :

PREPARATION OF DECOCTION :
Preparing plant samples to retain the biomolecules in the plants before extraction is the first step in the research of medicinal plants. Plant materials, whether fresh or dried, can be used to extract plant samples, such as leaves, barks, roots, fruits, and flowers. Grinding and drying plant materials also affects how long phytochemicals remain in the final extracts.[59]

The 5g of herbal components in the crude medicine sample were weighed.500ml of water was combined with the herbal components. After that, connect the reflux condenser, and carefully boil the ingredients for three hours in a water bath. Boiling the mixture reduced its total volume to onefourth of its original volume.

EVALUATION OF HERBAL COUGH SYRUP
According to the conventional approach outlined in Indian pharmacopoeia, physiochemical parameters such as specific gravity, density, pH, refractive index, alcohol content, and acid value were analyzed. Additionally, the color and smell tests were noted. [2,23,24]

Colour analysis :
The remaining five milliliters of syrup were poured into watch glasses and set under white tube light with a white backdrop. With the naked eye, its color was noted.

Odor analysis :
Two milliliters of the finished syrup were each sniffed. Two minutes separated the two scents in order to counteract the effects of the preceding scent.

Tasting analysis :
A little amount of the finished syrup was obtained and its flavor was assessed using tongue taste buds.

Determination of pH
Placed an accurately measured amount 10 ml of the final syrup in a 100 ml volumetric flask and made up the volume up to 100 ml with distilled water. The solution was sonicated for about 10 minutes. pH was measured with the help of digital pH meter.[60]

Density examination :

1. Cleaned the specific gravity bottle.

2. The bottle was cleaned at least two times with distilled water. 3)Measured the weight of empty dry bottle syrup withstopper(w1).

3. The bottle was filled with final syrup and placed the stopper,wipe out excess syrup from outside the tube.

4. Measure the weight in grams of syrup(w2), Calculate weight in grams of syrup(w3).

5. Formula of density: Density of liquid under test (syrup)=weight of syrup under test/volume of final syrup under test =W3/V

Viscosity examination :

1. Cleaned the Ostwald viscometer with warn chromic acid and necessary used an organic solvent such as acetone

2. Placed the viscometer an vertical position on a suitablestand.

3.Filled water in dry viscimeter up to mark G.

8. DISCUSSION & ANALYSIS :

Medicinal plants have long been a cornerstone of traditional medicine for treating cough, with many of these remedies now being supported by scientific research. While synthetic drugs like codeine and dextromethorphan are effective in suppressing cough, their side effects — including drowsiness, nausea, and addiction — limit their widespread use. Plant-based treatments, on the other hand, offer a potentially safer alternative. Active compounds such as saponins, flavonoids, and essential oils provide a multifaceted approach to treating cough by addressing the underlying causes, such as inflammation, irritation, and mucus accumulation.

For example, saponins found in plants like licorice and *Adhatoda vasica* stimulate mucus production, aiding in the clearance of respiratory secretions, while flavonoids reduce inflammation and oxidative stress in the airways. Essential oils like thymol and eugenol have antimicrobial effects, helping to clear infections that contribute to coughs.

Despite the promising potential of these plant-based remedies, several challenges remain. Variations in plant quality, preparation methods, and the concentration of active compounds can impact their effectiveness. Further research is needed to standardize plant extracts and ensure consistent therapeutic outcomes.

9. CONCLUSION:

Drugs like vasaca have proven bronchodilator activity. Adhatoda vasaca Nees leaves extract as traditionally used to manage cough. In the presence study leaves, Flower achieved therapeutic effect to relive cough and reduced airway of inflammation. The pharmacological result also demonstrate that Adhatodic acid from Adhatoda vasaca Nees. They

effective in reliving cough due to presence of polyphenolic compounds especially flavonoids .cough is common in the population, yet the true prevalence of these condition remains difficult to define. Those based on good evidence are more likely to improve the clinical outcomes. The clinical and basic research studies are still needed for better diagnosis, treatment, prevention of cough in children or adult .

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