HERBAL INHALATION PODS FOR NASAL DECONGESTION

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Abstract

The development and evaluation of herbal inhalation pods with natural components like mentha and clove oil to treat allergic rhinitis and nasal congestion are the main topics of this study. Pectin was used as the polymer base in the preparation of the pods, and their weight variation and dissolving time were assessed. The formed pods appear to match the necessary requirements for weight fluctuation, as evidenced by the results, and they dissolve quickly in hot water. Clove oil and mentha work in concert to relieve congestion in the nose and symptoms associated with allergies. In order to meet the growing demand for natural medicines with fewer side effects, the study highlights the growing significance of combining medicinal plant elements in contemporary pharmaceutical dosage forms. All things considered, the herbal inhalation pods offer a secure, practical, and efficient remedy for respiratory problems, which is fueling the market's increasing demand for herbal products.

Keywords:- Clove Oil, Mentha, Gelatine, Nasal Congestion

INTRODUCTION

Nasal cavity plays an important role in the respiratory system. The cell body required energy to carry metabolic reaction. This metabolic reaction plays important role in the proper body functioning of human. The metabolic reaction take place in presence of oxygen (O2) and the main waste product of these reaction is carbon dioxide (CO2). The atmospheric oxygen taken by the respiratory system of the body with this oxygen the surrounding air enter into respiratory tract. This air may be dry or moist, warm or cold and carry varying quantities of pollutant dust or dirt etc. air can damage the internal lining of the respiratory tract. The allergen, dust, pollutant stick to the inner lining of the respiratory tract and cause allergic rhinitis. The allergic rhinitis result in sleep disturbance, fatigue, mood depression and a decrease in cognitive function. This allergic rhinitis are treated with different herbal medicine (clove oil, eucalyptus oil, Ajwain oil, mentha, thymol, ect). This medicine are inhaled from nasal route and give relief from the allergic rhinitis.

Key word

ANATOMY OF NOSE

Position and structure

Nose is a part of the respiratory tract. The air inter the respiratory tract from nasal cavity. The oxygen (O2) is taken from atmospheric air and carbon dioxide (CO2) is expelled from body the overall proses is called as respiration.

The nasal cavity is divided in two equal part by the septum. the divided cavity is irregular. the posterior part of the septum is made of ethmoid bone and the vomer. Anteriorly made of the hyaline cartilage.

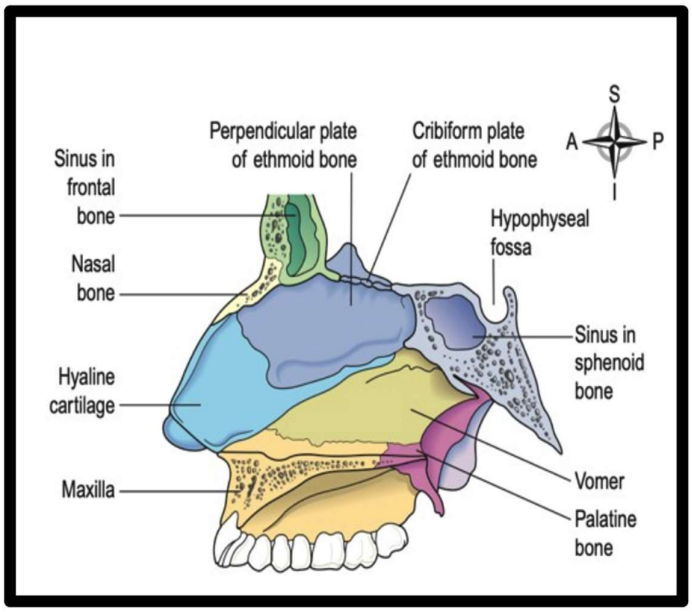

Figure 1: Structures forming the nasal septum.

The cribriform plate of the ethmoid bone and the sphenoid bone, frontal bone and nasal bones form roof. the roof of the mouth formed floor which is consists of the hard palate in front and the soft palate behind. The soft palate consists of involuntary muscle and the hard palate is composed of the maxilla and palatine bones.

The septum formed middle wall.
The maxilla, the ethmoid bone and the inferior conchae form lateral walls. The posterior wall of the pharynx form posterior wall Lining of the nasal cavity

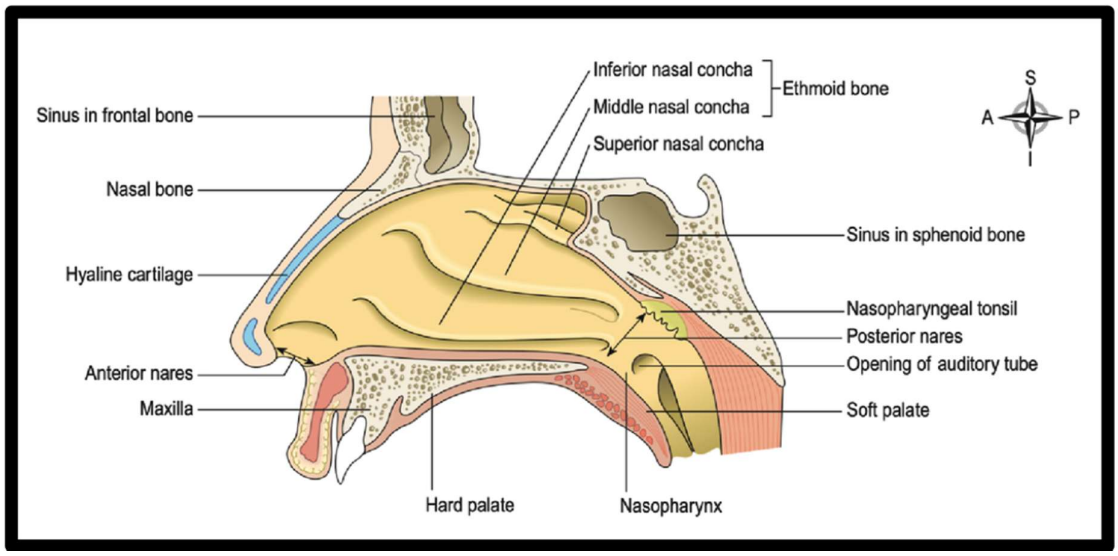

Figure 2: Lateral wall of right nasal cavity.

The nasal cavity is lined with ciliated columnar epithelium which contain gobalt cells they secret mucous. The nostrils is blend with skin and posterior part is extend to the pharynx

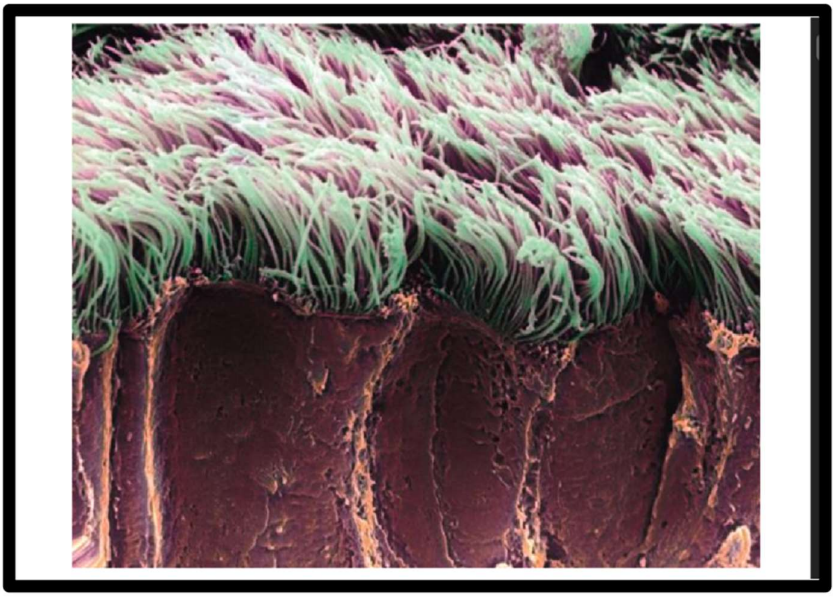

Figure 3: Coloured scanning electron micrograph of bronchial cilia.

Openings into the nasal cavity

Nostril are the opening of the nasal cavity. Nasal hair are present in the nasal cavity they are coated with sticky mucous.

The posterior nares are the opening from the nasal cavity into pharynx. The nasal bone have cavity called as the paranasal sinuses. There are tiny openings between the nasal cavity and paranasal sinuses. They are coated with mucous membrane

The main sinuses are:

- maxillary sinuses in the lateral walls
- frontal and sphenoidal sinuses in the roof (Fig B)
- ethmoidal sinuses in the upper part of the lateral walls.

The sinuses are used in speech and also lighten the skull. The nasolacrimal duct extend from lateral walls of the nose to the conjunctival sacs of the eye. They drain tear from eyes.

Factor causing nasal congestion

Rhinitis (rhin- nose, itis- inflammation) is cause due to allergen. Allergic rhinitis is type-I hypersensitive reaction. The allergic rhinitis cause the nasal congestion.

- Infections - such as colds, flu or sinusitis
- Irritants present in the air, tobacco smoke, perfume, dust and car exhaust
- Allergen

1. The respiration is the process of taking air inside the lunge and removing the air for lunge while respiration the air pollutant present in the air goes inside the respiratory system and cause allergic rhinitis. This is the main reason of the nasal congestion. The allergen bind or adhere to the inner lining of the respiratory tract and cause inflammation. This inflammation is responsible for release of excessive mucous and this mucous block the nasal cavity and respiration become difficult.
2. The infectious bacteria (viruses and fungi) inter in the body from the nasal cavity. This cause infection in the body. The primary symptoms of infection is itching in nasal cavity and inflammation in nasal cavity. The inflammation will cause release of mucous secretion this secretion will block the nasal cavity. The inflammation is cause due to inflammatory mediator (histamine, leukotriene C4, and prostaglandin D2) the inflammatory mediator cause contraction of the smooth muscle this will block the nasal

LITRETURE SEARCH : HERBAL INGREDIENTS USED IN NASAL CONGESTION

1) EUCALYPTUS OIL

Synonyms: Eucalyptus, , Blue gum, Stringy Bark Tree, Blue Gum Tree.

Biological Source

Eucalyptus oil is obtained by distillation of fresh leaves of Eucalyptus globulus and other species like E. polybractea, E. viminalis, and E. smithii, belonging to family Myrtaceae.

Eucalyptus oil is obtain from the leaves of the tree Eucalyptus. It is useful in reducing pain, swelling, and inflammation. It is active against bacterial species and cough suppressant actions.

Eucalyptus oil has a strong, camphoraceous scent and is known for its various potential health benefits. Some of its common uses include:

- Aromatherapy: Eucalyptus oil is often used in aromatherapy to promote a sense of relaxation and clear breathing. Inhaling the vapor of eucalyptus oil can help open up the airways and ease respiratory symptoms.
- Respiratory Health: Due to its anti-inflammatory and decongestant properties, eucalyptus oil is frequently used to relieve symptoms of respiratory conditions such as colds, coughs, and sinus congestion. It is a common ingredient in over-the- counter cough and cold remedies.
- Antimicrobial Properties: Eucalyptus oil has antimicrobial properties, making it effective against various bacteria and viruses. It is sometimes used as a natural disinfectant for surfaces and in cleaning products.
- Pain Relief: Eucalyptus oil is known for its analgesic (pain-relieving) properties. It is often used topically, diluted with a carrier oil, to soothe muscle and joint pain.
- Insect Repellent: The scent of eucalyptus is known to repel insects. It is commonly used in natural insect repellents and can help keep mosquitoes and other pests at bay.
- Hair Care: Eucalyptus oil is sometimes added to shampoos and conditioners for its refreshing scent and potential benefits for the scalp. It may help soothe an itchy scalp and promote hair health.

- Wound Healing: Eucalyptus oil may have antiseptic properties that can aid in the healing of wounds, cuts, and abrasions. However, it should be used with caution on broken skin and always be diluted to avoid skin irritation.

2) CLOVE OIL

Biological Source

Dried flower buds of Syzygium aromaticum (Eugenia caryophyllata/Caryophyllus aromaticus)

Clove oil extracted from dried flower bud of clove plant. It has been use as fragrance or flavouring spice in foods. it's topical application produce analgesic effect.Clove oil has antimicrobial.
Clove oil is known for its strong, spicy aroma. It has various uses, including:

• Dental Care: analgesic and antiseptic properties. It's often used to alleviate toothaches and promote Clove oil has been traditionally used for dental issues due to its oral health.

- Topical Application: It can be diluted and applied topically for its antimicrobial properties. Some people use it to help with skin conditions or to repel insects.
- Aromatherapy: The scent of clove oil is often used in aromatherapy to promote a warm and comforting atmosphere. It's believed to have stress-relieving properties.
- Flavoring: Clove oil is used as a flavoring agent in some foods and beverages, adding a distinct spicy and sweet flavor.
- Home Remedies: It is sometimes used in home remedies for various ailments, though it's important to use it cautiously and in appropriate dilutions.
- Respiratory Health: It contains eugenol, a compound with anti-inflammatory and antimicrobial properties that may help relieve congestion

3) THYMOL

Biological source: Thymol is a natural compound that is found in the essential oil of thyme, as well as in other plants. It has several uses and applications due to its antimicrobial and medicinal properties. Here are some common uses of thymol:

- Antimicrobial Agent: Thymol has strong antimicrobial properties and is used in various products for its ability to kill or inhibit the growth of microorganisms. It is often found in mouthwashes, toothpaste, and hand sanitizers.
- Oral Care: Thymol is commonly used in oral care products, such as mouthwashes and toothpaste, for its antibacterial properties. It helps in fighting bacteria that can cause badbreath and other oral health issues.
- Food Preservative: Thymol is used as a natural preservative in some food products. It has antioxidant and antimicrobial properties that can help extend the shelf life of certain foods.
- Medical Applications: Thymol has been studied for its potential medical applications. It has been used traditionally to treat various ailments, and research is ongoing to explore its therapeutic properties.
- Insect Repellent: Thymol is known for its insecticidal properties. It is used in some insect repellents and pesticides to ward off insects.
- Aromatherapy: Thymol contributes to the aromatic properties of thyme essential oil, and the oil is sometimes used in aromatherapy. It is believed to have relaxing and stress relieving effects.
- Antifungal Properties: Thymol has antifungal properties and is sometimes used in the treatment of fungal infections. It may be found in topical antifungal creams or solutions.
- Cleaning Products: Due to its antimicrobial properties, thymol is used in some natural cleaning products. It can help in disinfecting surfaces and eliminating bacteria.

4) MENTHA

Mentha Synonym: papermint oil, oleum mentha piperita ,mint oil.

Biological source: Mentha oil is acquired by steam distillation of flowering tops of mentha piperita Family: labiatae.

Other essential constituents are menthofuran, menthone, menthyl acetate, menthyl isovalerate. The oil Is used as a carminative, stimulant, flavouring agent , antiseptic. Therapeutical uses of mentha oil are as spasmolytic, smooth muscle relaxant, digestant, anti-inflammatory, antiulcer, nasal decongetion Methanol (I- menthol)is naturally occurring cold receptors which helps against use to provide sympathetic relief for upper airway congestion and menthol is also reduce sensation of dyspnoea.

Menthol helps in inhalation alter upper airway resistance in human Menthol has no effect on opening of block or resistance nasal airway menthol helps in activated by cold temperature and giving sensation of increased air flow.

some key points about menthol:

- Flavour and Fragrance: Menthol is often added to food, beverages, and personal care products for its minty flavour and cooling sensation. It is a common ingredient in products like toothpaste, chewing gum, candies, and throat lozenges.
- Medicinal Uses: Menthol has mild analgesic (pain-relieving) properties and is often used in over-the-counter topical analgesic products, such as creams, ointments, and balms, to alleviate minor aches and pains. It is also found in some cough drops and throat sprays due to its soothing effect on the throat.
- Respiratory Benefits: The cooling sensation of menthol can help relieve nasal congestion, which is why it is a common ingredient in some cough syrups and inhalers. It provides a refreshing feeling and can make breathing easier.
- Tobacco and Smoking Products: Menthol is frequently used as a flavouring agent in cigarettes and other tobacco products. Menthol cigarettes are known for their cooling and soothing effect, although they have been a subject of regulatory discussions due to concerns about their potential impact on smoking habits, especially among young people.
- Topical Applications: Menthol is widely used in topical products for its skin- cooling effect. It can be found in products like muscle rubs and patches designed to provide relief from sore muscles and joints.
- Pharmaceutical and Cosmetic Applications: Menthol is also used in pharmaceuticals and cosmetics for its aromatic properties. It is sometimes included in skincare products for its refreshing sensation on the skin.
- Natural Source: While menthol can be synthetically produced, it is also extracted from natural sources, primarily peppermint oil.

5) AJOWIN OIL

Biological source: Ajowin is the dried ripe seeds of Trachyspermum ammi (L.) Sprague, belonging to family: Apiaceae.

Ajwain fruits yield 2% to 4% brownish essential oil, with thymol as the major constituent (35% to 60%). Terpinene, and carvacrol. Extracts contain a highly hygroscopic saponin. Carvone (46%), limonene (38%), and dillapiole (9%).
Ajwain is the natural drug obtained from organisms such as most microbes plant animals. Ajwain is a characteristics aromatics smell and pungent taste .

The ajwain contents anti-inflammatory activity of alcoholic extract and total aqueous extract of the ajwain seeds was determine. Ajwain may help develop respiratory conditions such as asthma and bronchitis It is believed to have anti-inflammatory effects and may help minimize inflammation in the body.

Ajwain seeds have been used for culinary and medicinal purposes for centuries in various cultures. Ajwain oil is extracted from these seeds and possesses several potential health benefits. Here are some common uses of ajwain oil:

- Digestive Aid: Ajwain oil is known for its digestive properties. It can help alleviate indigestion, bloating, and gas. It is often used to relieve stomach discomfort and promote over all digestive health.
- Anti-inflammatory: The oil contains anti-inflammatory properties that may help in reducing inflammation in the body. It might be used topically or in aromatherapy to help with conditions related to inflammation.
- Respiratory Health: Ajwain oil is believed to have respiratory benefits. Inhaling the aroma may help in relieving congestion and promoting easier breathing. It is sometimes used in steam inhalation for respiratory issues.
- Antimicrobial Properties: Ajwain oil has antimicrobial properties that may help in fighting certain bacteria and fungi. It could be used topically for skin issues or as a mouthwash for oral hygiene.
- Pain Relief: The oil may have analgesic properties that could help in relieving pain, especially when applied topically.
- Menstrual Issues: Some traditional practices use ajwain oil to alleviate menstrual cramps. It might be applied topically or used in aromatherapy.
- Insect Repellent: Ajwain oil is believed to have insect-repelling properties and is sometimes used as a natural insect repellent.

6) CAMPHOR

Camphor Synonyms: (1R,4R)-camphor -camphor ,Camphor (natural), Camphor D-form , Camphor oil

Biological source: Camphor is a bicyclic monoterpene ketone establish widely in plants, especially Cinnamomum camphor.

Camphor is a compound used topically to help mitigate pain and also as a topical antiseptic and it is used in vaporizers to help suppress coughing. This medication should not be swallowed.

It Is used topically as a skin antipruritic and anti-infective agent. When ingested, camphor has a fast onset of toxic effects, and camphorated oil is the product most often responsible for its toxicity.
A compound used topically to help mitigate pain and also as a topical antiseptic. It is used in vaporizers to help suppress coughing. This medication should not be swallowed.

The FDA ruled that camphorated oil could not be distributed in the United States and that no product could consist of a concentration higher than 11%. It appears in the list of drug products withdrawn or removed from the market for safety and effectiveness. However, camphor can be establish in several non-prescription medications at lower concentrations.

Camphor is used as a antibacterial antifungal anti-inflammatory property it can be used to treat improve respiratory functions and relieve pain. Camphor oil works as a decongestant and cough suppression Vapor Rub was most effective relieving night of conjunction and sleep difficulty in children with upper respiratory tract infection.

Medicinal Uses:

- Topical Analgesic: Camphor is often used in topical analgesic products, such as creams and ointments, to relieve pain and reduce inflammation.
- Respiratory Relief: It is used in decongestant balms and inhalation products to alleviate respiratory congestion and promote easier breathing.

- Aromatherapy: Camphor is used in aromatherapy to provide a cooling and refreshing scent. Its aromatic properties are believed to have a calming effect on the mind and can be used in diffusers or added to potpourri.
- Pharmaceuticals: Camphor is used as an ingredient in various pharmaceutical preparations, including cough syrups, throat lozenges, and antimicrobial creams.

EXPERINMENTAL WORK:-

Mixing of the active ingredient with pectin:
The weighed quantity of the pectin is taken in beaker A and the weighed quantity of clove oil and mentha is mixed with the pectin

Preparation of gelatine base:
The 10 ml distilled water is taken in beaker B and weighed quantity of the gelatine is mixed in beaker B and the beaker is heated in water bath to dissolved the gelatine

Preparation of inhalation pods:
The molten gelatine is poured in the mould up to half (½) of its maximum quantity and the layer of gelatine is form. The mixture of active ingredient weighed and added to the mould. After adding the mixture of active ingredient the second layer of gelatine is added to cover the Formulation,[14]

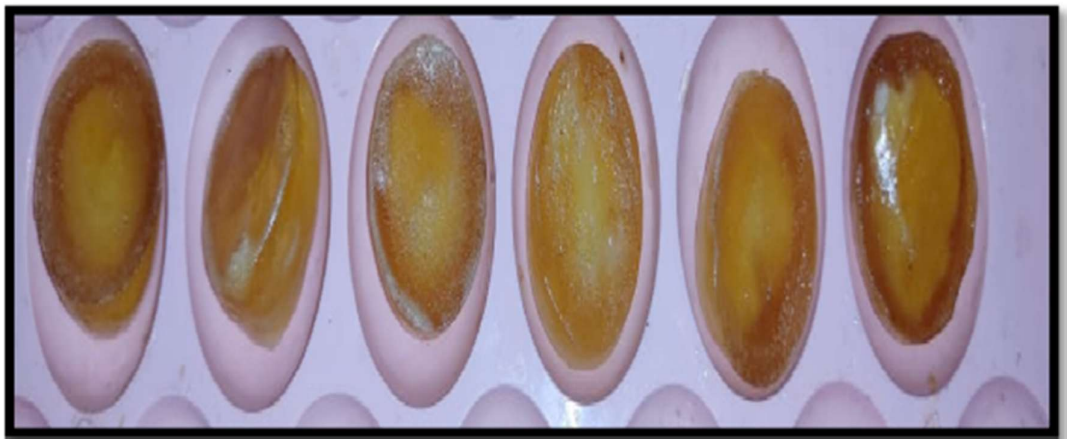

figure 4 formulation in moulds[15]

Ingredients	Role
Gelatine	Base
Clove oil	Nasal decongestion
Petroleum jelly	Lubricant for dies
Mentha	Nasal decongestion
Pectin	Polymer
Distilled water	Solvent

figure 5 formulation at freezing temperature[16]

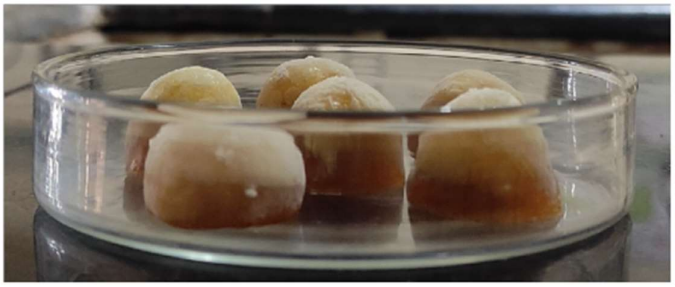

figure 6 formulation at room temperature[17]

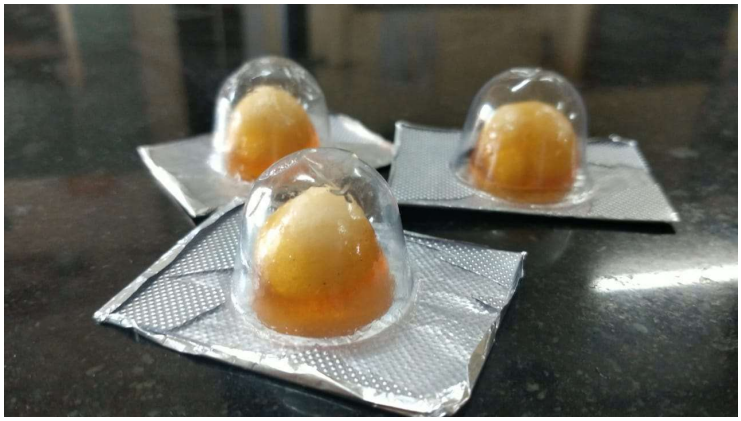

figure 5 packaging of herbal inhalation pods[18]

Evaluation of formulation:-

Weight variation test:

The weight variation of pods being made is routinely measured to help ensure that a pods contains the proper amount of drug.[19]

Dissolving time:

To determine the dissolving time of pods in hot water. The water is heated up to 900C and pod is added to hot water and dissolving time is measured with the help of the stop watch.[20]

RESULT AND DISCUSSION

Weight variation:

no.	weight(gm)
1	4.23
2	4.17
3	4.40
4	4.30
5	4.32
6	4.41
total	25.83

Total weight of all pods= 25.83

Average weight of pods = Total weight of all pods/ Number of pods

= 25.83/6= 4.305

Limit = percent deviation allowed * average weight/10

= 5 * 4.305/ 100 = 0.215

Upper limit = 4.305 + 0.215= 4.52

Lower limit = 4.305 - 0.215= 4.09

The upper and lower limit of the weight variation test if 4.52 and 4.09 respectively.[21]

Interpretation of weight variation test:

Not more than 2 tablet should outside the upper and lower limit and no tablet should twice.[22]

Dissolving time:

The dissolving time of the tablet is 1.32 second it is easily dissolved in the boiling water.[23]

DISCUSSION:-

From above result it can conclude that the formulation containing the clove oil, mentha will give relief from the various type of disease. The formulation is useful in nasal decongetion, allergic rhinitis, other bacterial infection of respiratory tract. The formulation contains the clove oil and mentha this two medicament are useful in the nasal decongetion the combine formulation of this substance gives synergistic effect. The clove oil, mentha are the natural source medicament they have various uses the nasal congestion can cure by using the above formulation as a inhaler in boiling water. the pods get easily disintegrate in boiling water and produce the vapour of clove oil, mentha this vapor inhalation give the relief from the allergic rhinitis as well as nasal decongetion.

In the present era, a large number of Indian population relay on the traditional system of medicine which is mostly plant based. Due to wide applicability of plant materials, now a day the development of herbal and ayurvedic preparations is increasing progressively. Specially, the incorporation of medicinal plant materials in the modern pharmaceutical dosage forms is gaining much importance. In pharmaceutical industry the various formulation and synthetic drug are available for nasal decongetion. The main aim of the formation is to prepare and evaluate the herbal formulation contain herbal ingredient. Extracted clove oil and mentha.[24]

CONCLUSION

Based on over research, it concludes that these pods give relief from the nasal decongetion and allergic rhinitis.

Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. As formulation contains clove oil it gives relief in headache which occur due to nasal congestion and mentha will give cooling effect.

The herbal inhaler have increasing demand in the world market. From the present study it can be conclude that the prepared pods inhaler was safe, convenient and efficient.[25]

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