

Preparation and Evaluation of Herbal Immunity Booster Syrup

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ABSTRACT

Both active and passive immunity are components of the immune system. Active immunization produces antibodies against the antigens, which are then kept forever. However, when immunization occurs, passively, antibody responses are triggered by the identical antigens in all previously infected patients. Herbal plants act as immune booster to strengthen both the adaptive and innate immune responses. A number of herbal plants, such as Ocimum Sanctum (Tulsi), Cymbopogon Citrates (Lemongrass), Syzygium Aromaticum L. (Clove oil), Zingiber Officinale (Dry Ginger), Cinnamum Zeylanicum (Cinnamon), Piper Nigrum (Black pepper), Curcuma Longa (Turmeric), have been shown in clinical studies to improve immunity. Herbal Medication boosts the immune system to protect against a variety of foreign infections while causing fewer adverse reactions than synthetic drugs. Numerous factors can lead to immune problems, which is the root cause of numerous illnesses, including cancer. As a result, controlling factors affecting the immune response is a possibly helpful tactic in the fight against illness. Many immune supplements are currently used in clinical practice to improve the immune response and host defense capacity; still, artificial medicines may have adverse reactions. A plant-based bioactive substances increase immunity by various mechanisms, such as activating immune organs, humoral immunity, cellular immunity, nonspecific immunity, and signal transduction pathways connected with immunity.

KEYWORD:- Immunity, Immune Booster, Herbal plants,

I. INTRODUCTION

The immune system is one of the most intricate biological systems in the body. It is an intricate network of specialty cells, organs, proteins, and substances. It is critical for giving protection against a range of pathogens, such as bacteria, viruses, and fungi.^[1] as well as malignant

cells. Host immunity is generally understood to consist of both innate (non-specific) and adaptive (specific) immunity.^[2-3] An organism is more susceptible to infections when its immune system is compromised. These infections can lead to the development of diseases like inflammatory bowel disease, rheumatoid arthritis, and allergy disorders.^[4-6] Unprocessed or naturally occurring plant foods, which may or may not contain bioactive components, are the basis for plant-based functional foods.^[7]

SARS-CoV-2, often known as the corona virus, was the cause of a global pandemic. It was initially discovered in Wuhan, China, in December 2019, and at that time, it had infected a large number of people. Cause global disease and death. It spreads from person to person and causes fever, sneezing, and coughing fits as a result of respiratory infections. The coronavirus can seriously harm individuals with weakened immune systems. The middle age range, which spans from 40 to 60 years old, is when the aging process began. This results in a decline in the immune system's ability to operate, making people more vulnerable to viruses. Many home remedies were used to maintain a strong immune system in order to combat the corona virus. Lots and lots of spices.^[8]

Immunological memory does not exist in the immune system's fundamental reaction, but if an antigen is encountered repeatedly in the future, the immune system is likely to remember it and create "memories" of it. An earlier delay occurs in the first antigen-best responses when in touch, and either pathogen-dependent or pathogen-specific adaptive immune function. Both innate immunity and adaptive immunity are thought of as identical defense mechanisms that enhance one another, with variations in either system, leading to host reactivity. The immune system is a complicated and multifaceted system that is essential to the body's defense against illnesses and infections.^[9]

the consumption of traditional herbal medicine in those days, are now pursuing their

interest by familiarizing themselves with traditional herbal products for the treatment of a range of health issues in diverse local, national, and international contexts (WHO) ^[1]. Undoubtedly, a significant increase in the last ten years has been seen by some skeptics.^[10]

in the public's interest in and acceptance of natural remedies for practical use in both industrialized and developing nations.^[11]

Due to this, herbal treatments are now available in syrup storage in preparation for commercialization, in addition to drug storage. Additionally, it has been meticulously and carefully estimated that up to four billion people, or 80% of the world's population, who live in poorer nations depend on herbal remedies^[12-13]

TYPES OF IMMUNO-BOOSTER

The body uses substances referred to as immune boosters to strengthen its immune system, which helps protect it from infections and diseases. There are many different types of available immune boosters, such as

Natural substance: - Organic immune boosters are often made from natural substances such as vitamins, minerals, and herbs. They aid in the immune system's normal and efficient functioning. For example, vitamin C supports the growth of white blood cells, the first line of protection the body has against pathogens. Zinc is essential for immune system function because it helps white blood cells defend against dangerous viruses and germs. Herbs like echinacea and garlic are believed to help the body fight off infections because of their antiviral and antibacterial properties.

Vaccines: A particular kind of immune booster, referred to as a vaccine, works by injecting just a little of the pathogen into the body. As a result, the immune system produces more antibodies to identify and combat the disease-causing culprit in the future. The spread of infectious diseases, including COVID-19, polio, and measles, has been proven to be effectively halted by vaccinations.^[14-15]

ROLE OF THE IMMUNE SYSTEM IN LIFE FACTOR

They also have significant influence over life decisions pertaining to maintaining immunological health. A few routines that can enhance immune function are as follows:

Sleep: The body requires enough sleep in order to heal and repair itself. While you sleep, the immune

system releases cytokines that aid in the battle against infection and inflammation.

Diet: The body can be provided with the nutrition it needs for a robust immune system by eating a diet high in a variety of fruits, vegetables, whole grains, lean meats, and healthy fats. Zinc and other minerals have a specific impact on immune system function. Vitamins A, C, D, and E in addition to selenium.

Exercise: Regular exercise improves circulation, reduces inflammation, and increases the production of white blood cells and antibodies, all of which help to strengthen the immune system.

Handling stress: Too much stress can impair immunity, making the body more vulnerable to illnesses. Techniques that increase immunity and reduce stress include yoga, mindfulness meditation, and deep breathing.^[16-19]

THE IMMUNE BOOSTER PROPERTIES OF PLANT BIOACTIVE COMPONENTS ^[15-22]

Tulsi

Synonyms: holy basil

Biological source: Tulsi is an aromatic perennial plant of *Ocimum Sanctum* in the family.

Family: Lamiaceae



Active ingredients: *Ocimum sanctum* is a plant that includes many different kinds of compounds, such as carvacrol, β -elemene, β -caryophyllene, rosmarinic acid, ursolic acid, eugenol, and germacrene. It is said that *ocimum holy* has diuretic and boosting properties.

Mechanism of action: Tulsi combats a variety of microbes because of a unique combination of qualities. Among them are antimicrobials (such as anthelmintic, antiviral, antifungal, antibacterial, and anti-protozoal).

mosquito repellent, anti-diarrheal, antioxidant, anti-cataract, anti-inflammatory, chemopreventive, radioprotective, hepatoprotective, neuroprotective, cardioprotective, antihypertensive, anticarcinogenic, analgesic, antipyretic, anti-allergic, immunomodulatory, central nervous system depressant, memory enhancement, anti-

asthmatic, antitussive, diaphoretic, antithyroid, and infertility. These medicinal benefits assist the body and mind in coping with a range of chemical, physical, viral, and emotional stressors while also promoting the restoration of biological and mental function.^[15-16]

Turmeric

Synonyms: Haldi, Halada.

Biological source: Turmeric (called Haldi in hindi language), and named by british as curry spice, is the dried rhizome powder of *Curcuma longa*.

Family: Zingiberaceae



Active constituent: Turmeric's primary pharmacological ingredient is thought to be the polyphenol compound curcumin (diferuloylmethane), which gives the spice its bright yellow color. The curcuminoids atlantone and bisdemethoxycurcumin are found in turmeric. Together with curcumin, there is also demethoxycurcumin, diarylheptanoids, and turmerone.

Mechanism of action: Numerous pharmacological properties, including wound healing, chemosensitivity, radiosensitivity, antiviral, antifungal, antioxidant, and anti-inflammatory activities, have been linked to curcumin, according to research.^[17-19]

Cinnamon

Synonyms: Ceylon cinnamon

Biological source: *Cinnamomum Zeylanium*, The source of cinnamon bark and leaf oils.



Active constituent: The primary components of cinnamon are its essential oil, which contains the compounds cinnamaldehyde and trans-cinnamaldehyde (Cin), which give cinnamon its scent and different pharmacological effects.

Mechanism of action: Research has shown that cinnamon extracts, essential oils, and their constituents can inhibit bacteria through a variety of mechanisms, including lipid profile modification, cell division inhibition, ATPase inhibition, membrane porin inhibition, motility inhibition, biofilm formation, and anti-quorum sensing properties.^[20-22]

Ginger

Synonyms: Zingiber, Zingiberis

Biological source: Ginger consists of rhizomes of *Zingiber Officinale*.

Family: Zingiberaceae



Active constituents: Ginger has a number of powerful and active components. Steam distilling powdered ginger yields ginger oil, which is mostly made up of zingiberene and other sesquiterpene hydrocarbons. The main volatile components in ginger have been identified by rhizome extracts.

Mechanisms of action: Ginger immediately affects the GI tract due to its carminative, aromatic, spasmolytic, and absorbed properties. It has been demonstrated that 6-gingerol and 6-shogaol exhibit pharmacological properties that include antipyretic, analgesic, and antitussive properties.^[23]

Clove

Synonyms: cleave

Biological source: Clove are the unopened flower buds of the clove tree.

Family: Myrtaceae



Active constituent: Cultivated in various Asian and African countries, such as India, Indonesia, Madagascar, Malaysia, Sri Lanka, and Zanzibar, this tree is native to the Moluccas. The Latin word "clavus" (nail) gives rise to the English term "clove," which refers to the plant's withered flower bud because of its resemblance to a little nail.

Mechanism of action: Clove oil's primary ingredient, eugenol, is said to have anticancer properties. In one investigation, HL-60 cells treated with eugenol displayed signs of apoptosis, such as DNA fragmentation and the development of DNA ladders in agarose gel electrophoresis. Eugenol was found to transduce the apoptotic signal by producing reactive oxygen species (ROS)^[15,17]

Black pepper

Synonyms: piper nigrum, Madagascar pepper

Biological source: Piper Nigrum, also known as black pepper is the member of piperaceae family. It is cultivated for getting its fruit.

Mechanism of action:

Piperine is hypothesized to function by boosting the flow of blood to the digestive system, which in turn encourages the active transfer of nutrients. Its ability to enhance absorption through a precise mechanism is not entirely known. Very quickly, piperine crosses the intestinal barrier.^[15,18]

1. Material and Method

A. Selected ingredients formulation of herbal immune booster syrup

- a. Tulsi
- b. Lemon grass
- c. Clove
- d. Ginger
- e. Black pepper
- f. Cinnamon
- g. Turmeric
- h. Jaggery

B. Formula

Table no 1: Materials (Ingredient table)

S. no.	Ingredients	Quantity (ml)	Uses
1	Tulsi	10	Antimicrobial agent
2	Lemongrass	10	Treat digestive tract
3	Clove	5	Reducing pain
4	Ginger	8	Treat arthritis
5	Black pepper	2	Enhance bioavailability
6	Cinnamon	2	Antioxidant
7	Turmeric	3	Anti - inflammatory
8	Jaggery	q. s.	Sweetening agent
9	De ionized water	q. s.	Vehicle
10	Perfume	q. s.	Flavoring agent

Method and Preparation of Herbal Immune Booster Syrup

In a small saucepan, combine the water, Elder Berries, Echinacea, and Astragalus root. Bring the mixture to a boil, then reduce heat and simmer for about 30-45 minutes, until the liquid has reduced by about half. Remove the saucepan from heat and let the mixture cool slightly. Strain the liquid through a fine mesh strainer or cheesecloth into a clean bowl, pressing on the herbs to extract all the liquid. Discard the herbs and return the liquid to the saucepan. Add the raw honey to the liquid and stir well until fully dissolved. Heat the mixture gently if needed to fully incorporate the honey. Pour the syrup into a clean glass jar or bottle and store it in the refrigerator.

Evaluation

1. Ash Value

In an Ash test, a measured 5 grams of the sample is carefully placed into a porcelain crucible that has been dried and pre-weighed. The crude drug is then burned off in an air atmosphere at temperatures exceeding 500°C. Afterward, the crucible is allowed to cool to room temperature within a desiccator, and its weight is determined.

2. Viscosity determination

Thoroughly cleanse the Ostwald viscometer by employing warm chromic acid, and if necessary, utilize organic solvents such as acetone. Next, mount the viscometer vertically on a suitable stand. Proceed by filling the dry viscometer with water up to mark G. Subsequently, measure the time taken in seconds for the water to flow from mark A to mark B. Ensure accuracy by repeating this step at least three times. Following this, rinse the viscometer with the test liquid and fill it up to mark A, then ascertain the time required for the liquid to reach mark B. Finally, determine

the densities of the liquid as outlined in the density determination experiment.

3. **PH Test** Determine the pH of herbal immune booster syrup by suitable means; it should be 6.0 to 7.0

4. **Turbidity Test** This device serves to assess the concentration of suspended particles in a water sample by gauging the incident light scattered at a right angle from the sample. The photodiode captures the scattered light, generating an electronic signal that is then converted into turbidity.

5. **Visual inspection:** During visual inspection, both the ingredient and the final product undergo meticulous scrutiny for purity and appearance. The physical appearance of the product is crucial for patient adherence and compliance, necessitating that it possesses a visually pleasing and elegant appearance.

6. **Physical stability:** The syrups must exhibit physical stability, ensuring that there is no crystallization or microbial growth affecting their appearance. The color should be fully soluble with other ingredients. Additionally, they should have a palatable odor and taste, and any solid material present must be completely miscible in the liquid.

II. RESULT AND DISCUSSION

The findings from this study indicate that the herbal immune booster formulation, once prepared, exhibits immune-boosting and antioxidant properties. The selection of components for the herbal immune booster formulation was based on their reported actions, which play both preventative and curative roles in preventing allergic reactions. The syrup prepared meets all physical parameters and demonstrates significant antioxidant activity (Table no 2).

Table no 2: Evaluation of Herbal Immune Booster syrup

S.no	Parameter	Observation
1	Colour	Yellowish Brown
2	Odour	Aromatic, Characteristics
3	pH	5.86
4	Viscosity	0.0188cps
5	Turbidity	Less turbid
6.	Visual Inspection	Clear
7	Physical stability	Stable at room temperature

Result and discussion:

Research on the possible advantages of herbal immune booster syrups is still underway, although opinions on how efficient they are have varied as have the findings. Certain herbs and components are frequently present in immunity booster syrups, like astragalus, elderberry, and echinacea, have been linked in certain studies to immune system support and decreased risk of infection. It is crucial to remember that the effectiveness of herbal immune booster syrups might vary depending on a number of factors, such as the specific health problems of each individual and the quality and dose of the ingredients, as well as lifestyle choices in general. Herbal immunity boosting syrups may have beneficial effects for certain individuals, such as decreased disease frequency or increased vitality. Others might not detect any appreciable differences. It's critical to use caution when using herbal supplements.

III. CONCLUSION -

In summary, as our immune systems are crucial in protecting our bodies from disease, maintaining a good immune system is critical to our overall health. Keeping yourself healthy and living a healthy lifestyle might help strengthen your immune system. Even though there are allopathic drugs that can combat oxidative stress and increase immunity, it's important to explore alternatives because of these drugs' expensive side effects. Ayurvedic medications have a potential future in natural medicinal development. It is anticipated that the primary component of an immune modulator medication that is safe, effective, and reasonably priced will be herbs. Because of the COVID-19 pandemic, humanity as a whole is suffering.

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