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Immunity from nature: Exploring the potential of herbal medicine and nutrition

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Abstract
The immune system is one of the complex and nature's most fascinating invention. Both active and passive immunity are components of the immune system. Active immunization produces antibodies against the antigens, which are then kept forever. The role of herbs in enhancing immune function has garnered substantial attention due to their natural and holistic benefits. Food components have long been recognized to play a fundamental role in the growth and development of the human body, conferring protective functionalities against foreign matter that can be severe public health problems. Herbal Formulation are mostly used for their less adverse effect. Herbal plants provide immune-boosting properties like *Tulsi, Neem, Ginger, Garlic, Cardamom, Lemon, Turmeric, Black Pepper, Black Cumin* etc. For protecting us by improving our immunity. This review discusses the role of herbs used in enhancing the immune functions. Also, the lifestyle including sleep, diet, exercise, stress and other things also affect the immune system of the body.

Keywords: Immune system, immunity booster, herbal plants, immunomodulation

1. Introduction
The immune system can be defined as a sophisticated association of varied immune cells and molecules that may provide adequate protection against infections or foreign intruders. The immune system may be categorized into two subsystems; the first is called a non- specific or innate system, and the other is called a specific or acquired system [1]. Host immunity is generally understood to consist of both innate (non-specific) and adaptive (specific) immunity. An organism is more susceptible to infections when its immune system is compromised [2]. Innate immunity, the natural defense mechanism we are born with, is our first line of defense and it responds promptly. The protection that we gain through life when we are exposed to various diseases or protection against them for vaccination is adaptive immunity, this adaptive immunity generates antibodies when it spots an enemy in the body. The adaptive immunity takes 5 to 10 days to generate antibodies and meanwhile innate immunity keeps fighting to maintain the levels of pathogens [3]. The immune system is relatively complex; thus, any factors influencing the functions of the immune system may also influence other systems in the human body, such as the nervous system, endocrine system, metabolism etc. [4]. The immune system is one of the complex and nature's most fascinating invention. Phagocytes, granulocytes, T cells, B cells, natural killer cells are the cells help to boost immunity [5]. The immune system is the body's primary defence mechanism, responsible for identifying and neutralizing harmful invaders like bacteria, viruses, and fungi. It operates tirelessly to maintain our health, but its effectiveness can be compromised by factors such as stress, poor diet, insufficient sleep, and exposure to environmental toxins [6]. Specific responses are dependent upon lymphocytes and their products, which include antibodies. Two types of acquired immunity exist: 1) Humoral immunity, which principally protects against extracellular pathogens and their toxins, and 2) cell- mediated immunity, which defends against intracellular pathogens. Humoral immunity is mediated by B lymphocytes (or B-cells) originating in the bone marrow and their secreted products, antibodies, or immunoglobulin's (Igs). Meanwhile, cellular immunity is mediated by T lymphocytes (or T cells) originating in the thymus [7]. The specific immunity is linked to the immunoglobulin's (Ig), produced by B cells in response to antigenic attacks, such as pathogens and allergens.

The Igs are further divided into IgA, IgG and IgE classes-all produced via isotype switching upon activation of them all, the IgAs are more relevant to the present review, as they can be found in saliva, tears, sweat, breast milk and mucosal secretions. The IgAs also help in controlling commensal bacteria at mucosal sites as well as protecting the body from infection [8]. Plant-based natural ingredients promote health and help fight infections by boosting host immunity. Some phytoconstituents increase the proportion of beneficial gut bacteria, which are crucial for maintaining immunity [9]. Ayurveda is the most suitable approach for modern in-vitro assays [10]. Rasa shastra and Bhaishajya Kalpana are the foremost branch of "Ayurveda" that chiefly deal with the formulation of medicines from various natural resources. The mechanism of trans formation where the drug is altered or its characteristics are augmented, is known as "Samskara [11]. The Ayurvedic system of medicine is one of the oldest systems of medicine and includes various ethnopharmacological activities such as immunostimulant, tonic, neurostimulation, anti-aging, antibacterial, antiviral, antirheumatic, anticancer, and adaptogenic [12]. Several medicinal plants as Rasayanas have been claimed to possess immunomodulatory activity, for example, *Holy Basil*, *Ginger*, *Fenugreek*, *Garlic*, *Turmeric*, and *Liquorice* [13]. A recent trend in society is the inclusion of certain anti-inflammatory drugs such as curcumin, Bramhi, Ashwagandha, turmeric which have been reported to be effective in disease detection. Turmeric has been traditionally used as a medicine or supplement in many countries in Asia due to its antioxidant, anti-inflammatory, anti- mutagenic, anti-cancer and anti-inflammatory properties. Many herbal products contain compounds that act as anti-inflammatory and anti-inflammatory agents [14]. Substances or techniques known as "Immunoboosters" are thought to improve immune system performance. They can consist of different vitamins and minerals, probiotics, herbal supplements, and lifestyle elements like exercise and stress management methods. Immunoboosters are designed to give the body the tools it needs to maximize immune response and guard against infection [15]. Plants are rich in flavonoids, vitamin C, or the carotenoids so can enhance immune function. The flavonoid-rich herbs may also possess mild anti-inflammatory action. Their beneficial effect named as anti-inflammatory and as an immune-stimulant action. It can promote the activity of lymphocytes, increase phagocytosis, and induce interferon production [16]. The nutritional condition of a person plays a significant influence on the efficiency of the immune system. Undernutrition, caused by the inadequate consumption of micronutrients, may impair the body's ability to support innate immune responses; however, nutritional status does not have the same effects for all diseases. Although the nutritional status of an individual may predict the clinical progression and prognosis of numerous diseases, including bacterial diarrhoea, viral diarrhoea, measles, pneumonia, tuberculosis, and others [17].

2. Immune system

Immune system also known as defence system because of body defence against infectious diseases or disorders. Immune system protects the body and it is made up of cells, tissues, and organs. Leukocytes are mainly involved in an immune system. Thymus, macrophage, B-cells, T-cells, bone marrow, spleen, lymph nodes are various parts of the body which are included in the immune system [5]. The immune system is broadly categorized into innate (non-specific) or adaptive (specific) [8].

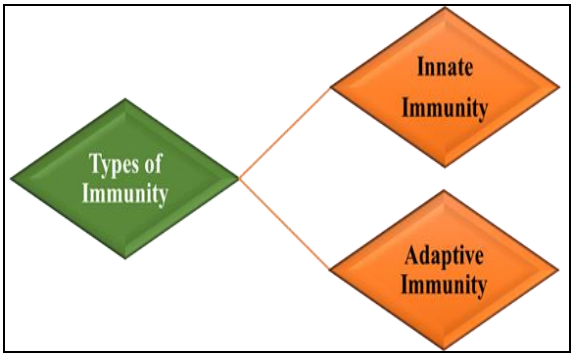

Fig 1: Types of Immunity [8]

2.1 Innate immune response

In an infectious process, the most common host response is to generate inflammation. Viruses in the absence of cytopathologic damage at early stages of infection inhibit the induction of acute phase protein response because early monocytes are not activated. However, the participation of natural killer cells against the virus plays an important role in the host's defence, they recognize cells infected by viruses in an antigen independent manner, exert cytotoxic activities and rapidly produce large amounts of interferon-γ that participate in the activation of the adaptive immune cell.

2.2. Acquired immune response

Acquired immunity relies on the capacity of immune cells to distinguish between the body's own cells and unwanted invaders. The host's cells express "self" antigens. These antigens are different from those on the surface of bacteria or on the surface of virus-infected host cells ("non-self" or "foreign" antigens). Microorganisms that overcome or circumvent the innate nonspecific defence mechanisms or are administered deliberately (active immunization) come up against the host's second line of defence: acquired immunity [18].

2.3. Passive immunity

Passive immunity occurs due to immunity gained from someone else and we are protected from pathogens or foreign particles. In this immunity gained from another body in the form of antibodies. The mother's milk contains antibodies hence immunity derived through mother's milk. Transferring the maternal antipathogen antibodies to developing foetus through umbilical cord. Also, by artificially passive immunity gained from antivenom antibodies [5].

3. Mechanism of immune system in humans

The immune system has originated to shelter the host from the vastness of space of hazardous microbes that are always fluctuating. Immunity also aids the recipient in the removal of inadvertently ingested harmful substances and allergens that enter through mucosal surfaces. The ability of the immune system to tell the difference between self and non-self is critical for creating a defence against an invading allergy, toxin, or virus. The host uses both adaptive and innate systems to recognize and eliminate pathogenic microorganisms, both of which need self-non-self-bigotry [19].

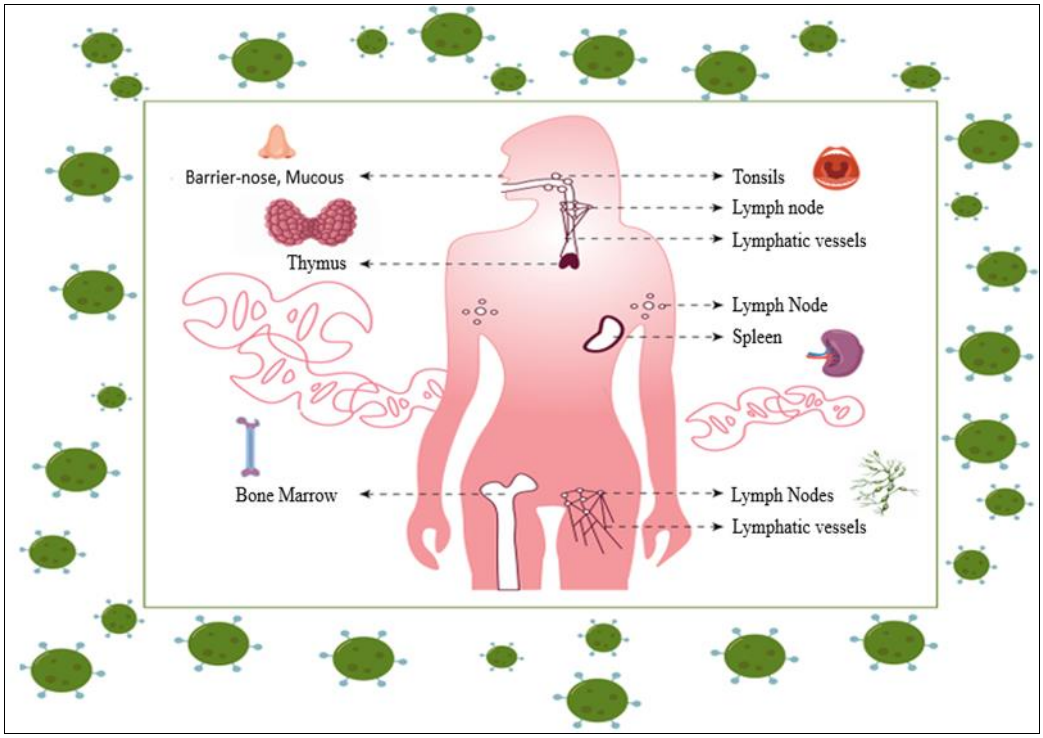

Fig 2: Representation of immune systems which includes skin, mucosa, immune system cells (macrophages, neutrophils, dendritic cells, and monocytes) present inside the human body [20].

The two functional divisions of the immune system comprise cytokines, antibodies, and cells, collectively called leukocytes. Phagocytes, monocytes, and lymphocytes come under the leukocytes category. Every cell in the immune system network initiates in the bone marrow and they are found circling in the bloodstream, structured into lymphoid organs like the spleen, thymus, lymphoid tissue, and lymph nodes or scattered in different areas around the body. The organs and certain lymphoid systems of the human immune system where the cells do their actual work of fighting off germs and foreign substances are presented in Fig. 2. When direct cell contact happens in the immune system, the involvement of adhesion molecules occurs by producing cytokines (chemical messengers), which are proteins [20].

4. Immunomodulators

Immunomodulators are naturally derived compounds and metabolites produced by healthy immune systems that maintain the equilibrium of the body. Immunomodulators are biological or synthetic drugs that can stimulate, inhibit, or regulate the components of the immune system or interfere with the immune system's functions. In clinical practice, immunomodulatory are classified into three main categories: immune stimulating agents, immunosuppressive agents, and immunoadjuvants. Immunoadjuvants are substances that boost the effectiveness of vaccines, which provide an immune-stimulating effect.

5. Immuno-stimulators

Immuno-stimulators, also known as immunostimulants, are substances that stimulate the immune system by activating or increasing the activity of one or more components. Immuno-stimulators boost the body's immunity against allergens, infections, cancer, and autoimmune responses [17].

6. Immunity Booster:

Substances known as Immunoboosters are used for improving the immune system, which aids the body's defence against illnesses and infections. There are numerous varieties of Immunoboosters on the market [15].

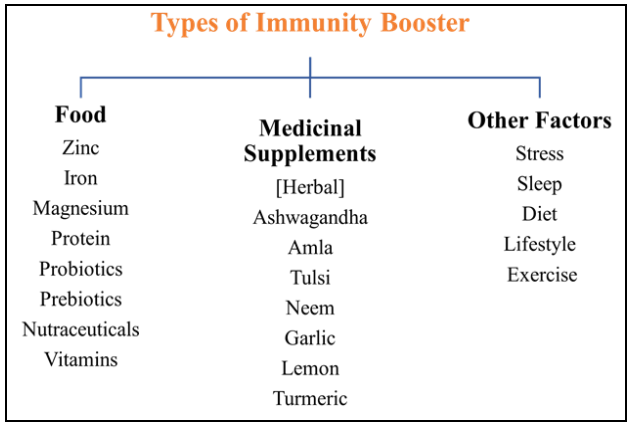

Fig 3: Types of immunity boosters [18]

Role of Immunity Booster

Diet Indian traditional foods are also known as functional foods because of the presence of functional components having antiviral, and antioxidants effects, dietary fibres, body-healing substances, and probiotics. These functional molecules boost immunities, help in weight control, and blood sugar level. For boosting the immune system, it is very vital to include protein, vitamins, minerals, and micronutrients in a regular [21].

6.1 Food

- **Zinc:** Zinc is an essential metal involved in a variety of biological processes due to its function as a cofactor, signalling molecule, and a structural element. It regulates inflammatory activity and has antiviral and antioxidant functions [22].
- **Iron:** Iron plays an important role in immune function. A diet containing too little iron can cause anaemia and weaken the

immune system. Foods rich in iron include meat, poultry, fish, shellfish, legumes, nuts, seeds, cruciferous vegetables and dried fruit. Combining iron rich foods with vitamin C can help boost your absorption even further [18].

1. **Magnesium:** Magnesium is an essential micronutrient required for various physiological processes, and there is increasing evidence that it is needed to support the normal functioning of the body's immune system [9].
2. **Protein:** Protein plays a vital role in the body's immune system, mainly for healing and recovery. Eat a variety of protein foods, like milk, unsalted nuts, seeds, curd, pulses, legumes, lean meat, poultry, eggs, etc. [21].
3. **Probiotics**: Live microorganisms known as probiotics have been shown to improve immune function among other health benefits. These microbes have the ability to increase the generation of antibodies, which are important for the defence against infections. Additionally, probiotics can improve the performance of immune cells, including natural killer cells and T cells, which are essential for recognising and removing foreign invaders [15].
4. **Prebiotic:** Foods including flax seeds, chia seeds, oats, barley, potato, apples, bananas, garlic, kiwi promotes the growth of friendly bacteria in the gut and helps the digestive system and builds a healthy immune system [21].
5. **Vitamins**: The nutritional benefits of vitamins and minerals depend on not only the amount of nutrients consumed, but also on how readily they are absorbed into the body.
6. Vitamin A - The richest food sources of vitamin A include dairy products, fish, liver, and fortified cereals; the top sources of provitamin A include broccoli, carrots, squash, and cantaloupe [17].

Vitamin E - Vitamin E is vital for maintaining the overall health of elderly people, including their immunity. Vitamin E is a powerful antioxidant that can protect you from various infections, bacteria, and viruses. Soaked almonds, peanut butter, sunflower seeds, and even hazelnuts should be consumed to get the daily dose of vitamin E [18].
Vitamin C, One of the important vitamins in the human body and is considered an antioxidant. It plays an important role in the function of the immune system [23].

6.2 Immunity by herbal drugs-
Plants are rich in flavonoids, vitamin C, or the carotenoids so can enhance immune function. The flavonoid-rich herbs may also possess mild anti-inflammatory action. Their beneficial effect named as anti-inflammatory and as an immune-stimulant action. It can promote the activity of lymphocytes, increase phagocytosis, and induce interfere on production [16].

Fig. 4 Immunity booster herbal Drugs [24]

- ***Ginger*:** Aadrak *Ginger*, known as Aadrak or Shunti in Sanskrit, is also known as Vishwa-Aushadh in Ayurveda, the Rasayana that is a cure to many disorders and hence the best immunity booster in Ayurveda. Have an inch long slice of Ginger with a pinch of rock salt prior to lunch, to cleanse the palate and stimulate appetite. This potent combination is also a known and effective antidote to Nausea [25].
- ***Cinnamon***: Like pepper, *Cinnamon* has been utilized for quite a long time for available in vitro and in vivo preparations. It shows antimicrobial, immunomodulatory, and low cholesterol, cardiovascular and antitumor properties. It is also revealed that cinnamon may works like insulin, actuates the insulin and starts the glucose digestion due to broad synthetics in it. Moreover, studies conducted discovered that they show high hypoglycaemic action. Primarily cinnamon is utilized for the treatment of type 2 diabetes mellitus [26].
- ***Wheat grass*:** *Tritium aestivam* a common name for the shoots of the wheat plant. Wheat grass has a high level of chlorophyll. The structure of chlorophyll is similar to that of haemoglobin. Sometimes it is called as gem blood. The chlorophyll in wheat grass has anti-bacterial properties, anti- inflammatory, antioxidant effects. Wheat grass contains high amount of a super food packed nutrients and antioxidants it may help boost immune system, aid in digestion, and give energy. Wheat grass enhances the function of immune system. This can help ward off infection and disease [27].
- ***Ashwagandha***: It is used as Antioxidant. On oral administration, Ashwagandha churna showed a significant increase in neutrophil adhesion and delayed-type hypersensitivity (DTH) response. It is concluded that *Ashwagandha* churna significantly potentiated cellular immunity. Ashwagandha also provides numerous other benefits for your body and brain [18].
- ***Fenugreek***: It is a diaphoretic that can induce sweating and aid in body detoxification. It also has a positive effect on blood purification. Because of the strong *fenugreek* scent, which is detected on the skin and in perspiration beneath the arms. Although fenugreek's primary function is to irrigate cells with nutrients and eliminate harmful wastes, dead cells, and stuck proteins from the body, it is also well known for its lymphatic cleansing properties

[28].

- ***Cardamom*:** *Cardamom* is a traditional aromatic plant from the family of *Zingiberaceae*. It has been demonstrated that *cardamom* possesses various pharmacological properties, such as antioxidant, anti-inflammatory, anticancer and antimicrobial properties. The aqueous extract exerts immunomodulatory effects as well, which have been validated in vivo. It has been shown to significantly enhance splenocyte proliferation in a synergistic and concentration-dependent manner; based on an enzyme-linked immunosorbent assay, cardamom was shown to significantly inhibit the release of Th1-cytokines from splenocytes and to enhance Th2-cytokine release [4].
- ***Tulsi***: *Tulsi* has a unique combination of actions that include antimicrobial, immunomodulatory. The leaves of this easily available plant are rich in phytonutrients (such as antioxidants and flavonol) chlorophyll, vitamins, and minerals, as well as eugenol, a bioactive compound that has antimicrobial, antifungal, and antibacterial properties [13].
- ***Amla*:** *Amla* is an herb, which is the richest source of vitamin C having great elementary and therapeutic importance. Vitamin c (ascorbic acid) glutamic acid, aspartic acid, praline, gallic acid, tannin and other minerals and amino acids are the constituents of Amla. Amla is one of the energy promoters as it tones up the functions of all the body organs. Amla increases RBC and WBC count and strengthens immunity. Amla is one of the major constituents of chyawanprash which is marketed as an immunity booster. As amla shows a valuable effect on cough, bronchitis and asthma it has more importance in the pandemic situation as a home remedy to boost immunity. Amla powder gives physical strength by improving immunity [5].
- ***Neem*:** *Neem* has antibacterial and antiviral activities, purifying and cleansing the blood from harmful toxins and boosts the immune system. It is used as neem chutney, crush some neem leaves into a glass of water [21].
- ***Lemon*:** Foods that are high in vitamin c and other antioxidants may help strengthen the immune system against the germs that cause the common cold and the flu [29].
- ***Turmeric*:** *Turmeric* powder is about 60-70% carbohydrates, 6-13% water, 6-8% protein, 5-Uses-*Turmeric* is among the richest food source of Iron 67.8mg per 100g of turmeric powder. Iron is important for improve immunities power and turmeric have riches Iron [3].
- ***Honey***: *Honey* contains antioxidants, for example: secondary plant materials, flavonoids, and ascorbic acid all are available in the natural *honey*. It has been observed that it improves the levels of white blood cells such as lymphocytes (both T and B cells which produce are producing plasma cells that developing antibodies), eosinophils, neutrophils, monocytes, and natural killer cells which are the essential cells of immune response to inflammation [23].

6.3 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 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 contain 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 [2].
- **Avoiding harmful habits:** The immune system can be weakened by smoking and excessive drinking, which raises the risk of infections [15].

7. Herbal Formulation

Herbal formulation shall mean a dosage form consisting of one or more herbs or processed herbs in specific quantities to provide specific nutrition, cosmetic benefits and other benefits means for use of diagnosis, treat, diseases of human being or animal to alter the structure or physiology of human being or animals.

7.1 Factors affecting herbal formulations

1. Drug adulteration.
2. Faculty collection.
3. Imperfect preparation.
4. Incorrect storage.
5. Substitution with exhausted drug [3].
6.

7.2 Advantages

1. **Synergistic effects:** Polyherbal formulations can produce a synergistic effect, where the combined effects of the herbs are greater than the effects of each herb alone. This can lead to enhanced therapeutic efficacy and better clinical outcomes.
2. **Multiple therapeutic effects:** Polyherbal formulations can target multiple disease pathways and have different therapeutic effects. This can provide a broader range of therapeutic benefits and help to address complex health conditions.
3. **Lower toxicity:** Polyherbal formulations can reduce the risk of toxicity and side effects associated with single herbs by using lower doses of each herb while maintaining therapeutic efficacy.
4. **Personalized medicine:** Polyherbal formulations can be tailored to individual needs based on the specific health condition and symptoms [30].

7.3 Disadvantages

1. Herbal drugs have slower effects as compared to allopathic dosage form.
2. They are difficult to hide taste and odour.
3. Most of the herbal drugs are not easily available.
4. A few herbal remedies may cause side effects [3].

8. Conclusions

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. The present general overview of the few selected, very broadly promoted and highly popular immunomodulatory herbs. Prevention is always better than cure. Traditionally, these plants have various benefits, which helps in today's life. To help or boost the immunity, the various herbs play a vital role by promoting beneficial bacteria in the body. Various dietary sources can provide vitamins and minerals, which support and strengthen our immune systems. Various vitamins like A, C, D, and E are investigated to provide important aspects for improving immunity. Functional foods such as probiotics and prebiotics are the future of health-promoting foods. These plants have various benefits, which are used in day today life. The traditional remedies increase when conventional medicine is ineffective. They play an important role to become healthy.

9. References

1. Al Mahmud A, Siddiqui SA, Karim MR, Al-Mamun MR, Akhter S, Sohel M, *et al*. Clinically proven natural products, vitamins and mineral in boosting up immunity: A comprehensive review. Heliyon. 2023 Apr;9(4):e15292. DOI: 10.1016/j.heliyon.2023.e15292. EPUB 2023 Apr 7. PMID: 37089292;PMCID: PMC10079597.
2. Kaser Y, Pathak A, Shandilya K, Wamankar S, Nema R. Preparation and evaluation of herbal immunity booster syrup. International Journal of Pharmaceutical Research and Applications. 2024;9(2):2279-2285. DOI: 10.35629/4494-090222792285
3. Tiware S, Warghane K, Samrutwar J. Herbal immunity booster against Covid-19: A review. International Journal of Pharmaceutical Chemistry and Analysis. 2022;9(4):151-155.
4. Kadiyska T, Tourtourikov I, Dabchev K, Zlatarova A, Stoynev N, Hadjiolova R, *et al*. Herbs and plants in immunomodulation. International Journal of Functional Nutrition. 2023;4(1):1-11
5. Kareppa M, Solunke D, Kamble V, Deshmukh S, Chavan C, Sakhare V. A comprehensive review on vyadikshamatva against the pandemic, COVID-19. World Journal of Pharmaceutical Research. 2021;10(14):676-691.
6. Otieno B. Natural immune boosters: a review of ten key herbs for enhancing immune function. Australian Herbal Insight. 2019;1(1):1-6.
7. Medoro A, Davinelli S, Colletti A, Micoli V, Grandi E, Fogacci F, *et al*. Nutraceuticals as modulators of immune function: A review of potential therapeutic effects. Prev. Nutr. Food Sci., 2023;28(2):89-107. ISSN 2287-8602, Https://doi.org/10.3746/Pnf.2023.28.2.89
8. Tolulope A. Immune boosting functional foods and their mechanisms: a critical evaluation of probiotics and prebiotics. Biomedicine & Pharmacotherapy. 2020;130: 110625. 1-11
9. Gasmi A, Shanaida M, Oleshchuk, Semen OY, Ivankiv M, Pokryshko Y, *et al*. Natural ingredients to improve immunity. Pharmaceuticals. 2023;16:528. Https://doi.org/10.3390/ Ph1604052804
10. Ganguly D, Ghosh S, Banerjee M, Mandal A, Panja S, Choudhury A. A brief review on different plant parts used as immunity boosting agent. Journal of Applied Pharmaceutical Research. 2022;10(1):1-6.
11. Rani S, Sharma U, Deshmukh M, Kumar V, Sharma K, Malik M, and Subramaniyan V. Immunomodulatory and antioxidant potential of polyherbal dhatryadi rasayana in the form of churna and granules. Acs Omega. 2024;9:14781-1479.
12. Olarewaju O, Fajinmi O, Naidoo K, Arthur G, Coopoosamy R. A review of the medicinal plants with immune-boosting potential. Journal of Medicinal Plants for Economic Development. 2022;6(1):A158. Https://doi.org/10.4102/ Jomped.V6i1.158
13. Brar S, Sharma A., A review on medicinal herbs as immunity booster. Pharmaspire. 2021;13(1):15-20.
14. Gadge S, Pingale R, Nimse K, Jadhav S., Design of polyherbal powder drink formulation as an immunity booster. Jchr. 2024;14(5):212-224 | Issn:2251-6727
15. Gawai A, Shelke P Sanap G., A review on medicinal herbs as immunity booster. World Journal of Pharmaceutical Research. 2024;13(2):231-248.
16. Khodadadi. S. Role of herbal medicine in boosting immune system. Immunopathol Persa. 2015;1(1):E01
17. Mitra S, Paul S, Roy S, Sutradhar H, Bin T, Nainu F, Khandaker M, *et al*. Exploring the immune-boosting functions of vitamins and minerals as nutritional food bioactive compounds: A comprehensive review. Molecules. 2022;27: 555. https://doi.org/10.3390/ Molecules27020555
18. Namdeo P. A review on herbal immunity booster and nutrition to fight against covid-19, J Pharm Adv Res, 2021;4(5):1226-1237.
19. Pandey V, Tripathi A, Srivastava S, Pandey S, Dar A, Singh R, *et al*. A systematic review on immunity functionalities and nutritional food recommendations to develop immunity against viral infection. Applied Food Research. 2023;3(1):100291, ISSN: 2772-5022, Https://doi.org/10.1016/J.Afres.2023.100291
20. Stephen J, Manoharan D, Radhakrishnan M. Immune boosting functional components of natural foods and its health benefits. Food Prod Process and Nutr. 2023;5(61).1-25. https://doi.org/10.1186/S43014-023-00178-5
21. Alghamdi S, Mohammad A. Role of immunity booster diet, spices and herbs, change lifestyle: medical viewpoints in COVID-19. International Journal of Advanced Biological and Biomedical Research. 2022;10(1):18-31.
22. Mrityunjaya M, Pavithra V, Neelam R, Janhavi P, Halami PM, Ravindra PV. Immune-boosting, antioxidant and anti-inflammatory food supplements targeting pathogenesis of covid-19, Front. Immunol., 2020;11: 570122, 1-12. DOI: 10.3389/Fimmu.2020.570122
23. Mahmood M, Younus Z. Booster foods for your immune system: healthy notes to consumers. A short review. Acta Scientific Microbiology. 2021;4(8):151-157.
24. Ashaolu T. Immune Boosting Functional Foods and Their Mechanisms: A Critical Evaluation of Probiotics and Prebiotics. Biomedicine & Pharmacotherapy. 2020;130. 1-11. 110625.
25. Gupta A. The immune booster supplements. Pharma Herald Bulletin, 2020, p. 3.
26. Dhamdhere N, Panchbhai A, Dhamdhere A. Ayurvedamrut Kadha: The Immuno Booster. J Res Med Dent Sci. 2022;10(9):240-244.
27. Mulagada S, Adari D, Akkivarapu H, Kakithapalli C,

Netti H, Palli J, *et al*. Preparation and evaluation of immune boosting syrup using wheat grass & pumpkin seeds extract. International Journal for Multidisciplinary Research. 2024;6(2).
28. Rambhade N, Ambhore S, Hire P, A review on study of polyherbal nutraceutical formulation. International Journal of Pharmaceutical Research and Applications. 2024;9(2):724-728.
29. Prasad S, Vadivel D, Sinthia J. Immune boosters: A review on natural herbal remedies for COVID-19 related symptoms. International Journal of Research Publication and Reviews, 2022;3(1):664-668.
30. Rajput H, Singh S, Abutahir. Polyherbal formulations for anti-inflammatory activity: A comprehensive review. Hakim Singh Rajput/Afr. J. Bio. Sc. 2024;6(12).