

A REVIEW ON A ROLE OF HERBS AND HERBAL PLANTS AS AN IMMUNOMODULATORS

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Abstract

For thousands of years, humans have used herbal treatments to heal a variety of body ailments. The majority of phytochemicals, which have many pharmacological applications and include alkaloids, polyphenols, terpenoids, glucosinolates, and glycosides are found in plants. The ability of these active compounds to operate as immunomodulators has been shown through clinical research. The innate and adaptive immunological responses of the immune system can be enhanced or inhibited by a substance known as a herbal immunomodulator. Global scientific study is currently centred on how different medicinal plant components can alter the immune system. There have been numerous claims that Various Rasayana Indian Natural Herbs have immunomodulatory characteristics. The review principally focuses on 13 Indian kitchen plants that are used as spices which enhances immune response in the body by both specific and non-specific mechanism.

Keywords: Immunomodulators, Immune system, Immune boosters, Natural herbs, Immunostimulants And Immunosuppressant.

1. INTRODUCTION

One of our body's most intricate biological systems is the immune system. The word immunity is derived from the Latin word *immunes*, which means "exempt from." Immunity is usually defined as a state of relative resistance to infection[1].

Substances capable of stimulating immune mechanisms are called antigens. Our bodies are built to protect us from external threats like illnesses and infections. An organism's immune system works to protect its homeostasis while fighting off these invaders. In an organism, the immune system makes a distinction between self- and non-self cells.

It is now considered a standard treatment strategy to modify immune functioning utilising medicinal plants and their compounds. Since the beginning of time, plants and minerals have been utilised to heal a wide variety of maladies. It is now understood that immune response immunomodulation may offer an alternative to traditional chemotherapy for a variety of disease conditions, particularly when the host's defence mechanism needs to be activated in the presence of impaired immune responsiveness or when a selective immunosuppressant needs to be induced in conditions like autoimmune disorders and organ transplantation. A person's ability to discern between foreign objects and "self" and to neutralise and/or destroy the alien objects is made possible by their immune system, which is a carefully balanced, complicated, multicellular, and physiological process[2].

1.1. History Of Immunology:-

Immunology is a science that examines the structure and function of the immune system. The earliest known mention of immunity was during the plague of Athens in 430 BC, according to experts at the London School of Medicine (LSA) describes immunology as the study of the body's response to disease[3].

Pierre Louis Moreau de Maupertuis conducted studies with scorpion venom in the 18th century and discovered that some dogs and mice were resistant to it[4].

Louis Pasteur later used these and other studies of acquired immunity in the creation of vaccinations and his germ theory of illness. The miasma theory and other modern theories of disease were in stark contrast to Pasteur's notion. Microorganisms were not recognised as the root cause of infectious disease until Robert Koch's 1891 proofs, for which he was given the Nobel Prize in 1905. When Walter Reed identified the yellow fever virus in 1901, viruses were recognised as human pathogens[5].

1.2. Types of immunity :-

Immune systems can be divided into innate and adaptive types. Our first line of defence is innate immunity, the quick-response natural defence system we are born with. When we are exposed to many diseases over time or when we are immunised against them, we acquire what is known as adaptive immunity. When this adaptive immunity recognises an enemy within the body, antibodies are released. The adaptive immunity requires five to ten days to develop antibodies while the innate immunity battles to keep pathogen levels stable[6][7][8].

Overview of the Immune System

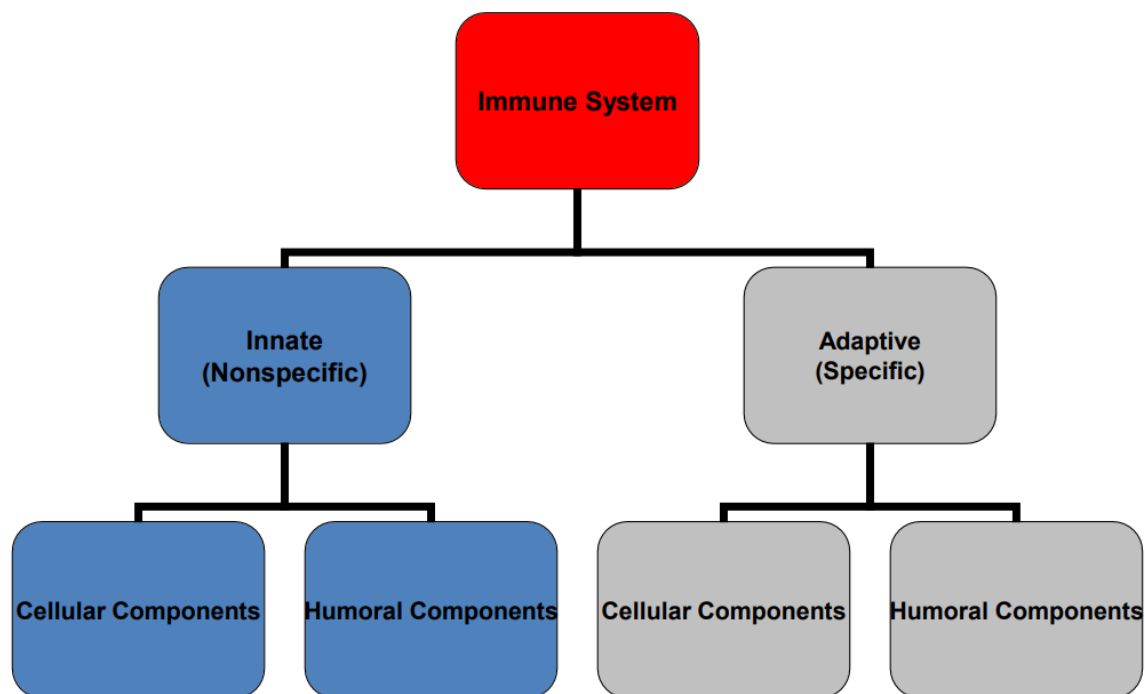


Fig 1. Types of Immune System

1.2.1. Innate Immune Response:-

The typical host reaction during an infectious process in order to cause inflammation. Because early monocytes are not activated in the early stages of infection, viruses prevent the production of the acute phase protein response. Natural killer cells, on the other hand, play an important part in the host's defence when they work against viruses. They can identify virus-infected cells without the need for an antigen, engage in cytotoxic activity, and quickly produce large amounts of interferon, which helps to activate adaptive immune cells[9].

1.2.2. Adaptive Immune Response:-

The ability of immune cells to discriminate between the body's own cells and undesirable intruders is crucial for acquired immunity. "Self" antigens are expressed by the host's cells. These antigens are distinct from those found on bacterial or virally-infected host cell surfaces ("non-self" or "foreign" antigens). The host's second line of defence is vulnerable to microorganisms

that defeat or avoid the innate nonspecific defence mechanisms or are intentionally provided (active immunisation): acquired defence[7].

1.3.Immunomodulators:-

Immunomodulators are substances either natural or artificial that suppress, stimulate or otherwise modify the immune response[10][11]. They are also referred to as disease-modifying drugs(DMDs)[12].

1.4.Classification of Immunomodulators:-

1.4.1.Immunostimulants:-

The phrase "immunostimulation" refers to a preventative or therapeutic idea that works to activate our body's general immune system. The non-antigen dependent is what this indicates in particular.enhancement of the effectiveness and function of Complement, macrophages, granulocytes, and The natural killer (NK) cell[13].

Immunological defence is a complex interaction between nonspecific and specific immunological responses, cellular and humoral immune responses, activation and inhibition of immunocompetent cells, and the effect of endocrine and other mechanisms on the immune system. The complement system or T or B lymphocytes are the Immunostimulants main targets, and an increase in phagocytosis by macrophages and granulocytes is a key component of immunostimulation. It is likely crucial for the stimulating substances to stay in contact with the reactive cell that macrophages are activated. The second-most significant function is the activation of T cells, which is accomplished directly or indirectly by macrophages[14].

1.4.2.Immunosuppresant:-

These medications could be used to treat immunological pathology linked to infections as well as autoimmune illnesses, graft rejection, graft versus host disease, and immediate or delayed hypersensitivity immune reactions. Out of the list, these medications have primarily been used to treat autoimmune illnesses and avoid transplant rejection.

Immunosuppression mostly refers to a reduction in response to stress and infections, although it can also result from environmental or pharmacological factors[13].

1.4.3.Immunoadjuvant:-

Specific molecules combined with specific vaccines will result in a higher level of protection than vaccines alone when both are used in a mixture[12].

1.5.Physiological Action:-

When infectious organisms invade our bodies or enter through vaccination, the immune system can still operate. A Macrophage engulfs, swallows, and consumes an antigen, yet the same immune system (antibodies and cytotoxic T-cells), which was previously discussed, can occasionally lead to the destruction of the tissues or cells that make up our body. Before the connection between the proteins of the macrophage and the Helper T cells develops and becomes active, the macrophage displays an antigen fragment on its surface. either TH 1 or TH 2 cells that secrete, multiply, and grow. a variety of cytokines. the TH 1 cells' cytokine production triggers cytotoxic T cells to go after and kill infected cells[8][15].

1.6.Percentage Of Immunomodulators Component[16]:-

Table 1.Percentage of Immunomodulators Components

Product or Supplement/ Frequency of Consumption	Daily	A Few Times a Week	Once a Week or Several Times a Month	Several Times a Year	Never
foods rich in omega-3	7.5	25.8	45.8	18.4	2.5

supplements rich in omega-3	7.5	9.2	10.0	22.5	50.8
foods rich in vitamin A	28.3	45.0	25.0	0.8	0.8
supplements rich in vitamin A	8.3	10.0	11.7	19.2	40.8
products rich in β -carotene	31.7	40.8	26.7	0.0	0.8
supplements rich in β -carotene	3.3	4.2	17.5	15.0	60.0
products rich in vitamin E	16.7	26.7	45.0	9.2	2.5
supplements rich in vitamin E	6.7	3.3	21.6	16.7	51.7
products rich in vitamin C	39.2	40.0	16.7	2.5	1.7
supplements rich in vitamin C	12.5	10.8	27.5	19.2	30.0
products rich in vitamin D	2.5	13.3	56.7	20.8	6.7
supplements rich in vitamin D	11.7	11.7	15.8	15.8	45.0
products rich in iron	39.2	35.0	22.5	2.5	53.3
supplements rich in iron	4.2	7.5	21.7	13.3	0.8
products rich in zinc	15.8	19.2	48.4	15.0	1.6
supplements rich in zinc	3.3	5.8	14.2	16.7	60.0
products rich in selenium	19.2	25.8	48.4	5.8	0.8
supplements rich in selenium	2.5	1.7	16.7	11.7	67.5
products rich in probiotic bacteria	25.0	38.3	30.8	5.0	0.8
supplements rich in probiotic bacteria	5.0	5.8	15.0	26.7	47.5

1.7. Ayurveda and Immunomodulation:-

India is renowned for its ethnobotanical endeavours; there are several references to medicinal plants and their usage that date from between 3500 BCE and 800 BCE that are mentioned in the Vedas and Samhita. The "Vrikshayurveda," which is covered in Vedic sources, namely the Rigveda and Atharvaveda, has the first record of herbal therapy. Ayurveda is a traditional herbal medical system, who may trace their lineage back to the Indus Valley to the years 3300 to 1300 BCE. The terms "Ayurveda" and "Veda," which together indicate knowledge and life, are the roots of the name.

In order to avoid disease in both humans and animals, Ayurveda uses four key techniques: Prakrati shapnam (Health Maintenance), Naisthika Chikitsa (Spiritual Therapy), Roganasmani Chikitsa (Disease Cure), and Rasayana Chikitsa (Herbal Product Therapy)[17].

The name "Rasayana" is a combination of the words "Rasa" and "Ayana," which both imply "way of life." Rasayana is known as a rejuvenation therapy since it enhances the body's internal systems in such a way that life expectancy, memory, intelligence, skin condition, and bodily vitality are all increased[18].

2. HERBALS PLANTS AND HERBS AS IMMUNOMODULATORS:-

A number of herbs have intricate effects on immune function and act at various places in the overall cascade of immunological responses, according to recent studies on natural remedies. These plants have the potential to be strong immunity boosters[19].

Over 80% of people worldwide use herbal treatments to bolster their immune systems, according to the WHO, and maintain overall wellness. This review article offers an overview of certain natural plants. The plant generates a vast variety of organic chemicals, both primary and secondary. These metabolites (also known as physiologically active components) have been employed in industrial and commercial levels, several sectors[20].

ASHWAGANDHA:-

Common names:- Indian Ginseng, Indian Winter Cherry

Biological Source:-

It consists of the dried roots and stem bases of *Withania somnifera* Dunal.

Family:- Solanaceae.



Fig 2. *Withania somnifera*

Chemical Constituents:-

The plants contain the alkaloid withanine as the main constituent and somniferine, pseudo withanine, tropine and pseudo tropine, hygrine, isopellegerine, anaferine, anahygrine and steroid lactones. The leaves contain steroid lactone, commonly known as withanolides.

Uses:-

It serves as an antioxidant. Ashwagandha churna significantly increased neutrophil adhesion and the delayed-type hypersensitivity (DTH) response after oral treatment. Ashwagandha churna also enhanced the cellular immunity. There are a tonne of other advantages of ashwagandha for your body and brain. For instance, it can improve cognitive performance, reduce blood sugar and cortisol levels, and aid in the treatment of anxiety and depressive symptoms[21][22].

The body's white blood cells can be raised by Ayurvedic therapy cells that improve immunity[23]. Ashwagandha has Long regarded as a superior rejuvenator, a both a general tonic for health and a treatment for several health complaints. It has sedative, diuretic, anti-inflammatory, immune-stimulating, and energy- and endurance-boosting properties in addition to its adaptogen and anti-stress properties. Colds and coughing are treated with ashwagandha, diabetes, conjunctivitis, ulcers, emaciation, epilepsy, Parkinson's disease, leprosy, senile dementia, and sleeplessness intestinal diseases, rheumatoid arthritis, nervous infections, asthma, bronchitis, impotence, and a in HIV/AIDS patients, suppressant. Ashwagandha has substantial effects on the hematopoietic system, acting as a chemo protective substance that also regulates the immune system[24][25].

GINSENG:-

Common names:- Asiatic ginseng, Chinese ginseng, five fingers, Japanese ginseng, Jintsam

Biological source:-

Panax ginseng C.A. Mey and other *Panax* species like *Panax japonicus* (Japanese Ginseng), *Panax pseudoginseng* (Himalayan Ginseng), *Panax quinque-folius* (America Ginseng) and *Panax vietnamensis* (Vietnamese Ginseng).

Family:- Araliaceae.



Fig 3. Panax ginseng

Chemical Constituents:-

Triterpene glycosides, often known as saponins or ginsenosides, are present in Panax ginseng. All portions of the plant contain a variety of active substances, such as amino acids, alkaloids, phenols, proteins, polypeptides, and vitamins B1 and B2.

Uses:-

Since roughly 5000 years ago, ginseng has been utilised for a number of things. It has been used to promote physical stamina and decrease fatigue, to enhance stress tolerance, and to boost focus. Additionally, it is utilised for asthma, anaemia, diabetes, gastritis, erectile dysfunction, impotence, and male fertility. Panax ginseng is used to treat cancer, insomnia, neuralgia, rheumatism, dizziness, headache, convulsions, problems during pregnancy and childbirth, hot flashes associated with menopause, and to delay the ageing process.

Panax ginseng preparations have an impact on the immune system and the hypothalamus-pituitary-adrenal axis. The researchers found that standardised ginseng extract is superior to liquid ginseng extract in terms of immune system stimulation[26].

PURPLE CONEFLOWER:-

Common names:- Sampson, Snakeroot, Red sunflower.

Biological Source:-

It is obtain from *Echinacea purpurea* (L.) Moench (EP) is a perennial herbaceous flowering plant.

Family:- Asteraceae.



Fig 4.Echinacea perpurea

Chemical constituents:-

Muco polyccharides have been found in Echinacea. Isobutyl mines, linoleic acid, echinaceine, echinacoside, and essential oils, glycosides, inulin, poly acetylenes, sesquiterpenes, betaine, and phenolics are among the ingredients that are present. Moreover, echinacea includes trace levels of iron, iodine, and calcium. vitamin A, vitamin E, potassium, copper, sulphate, and supplement[27][28].

Uses:-

Echinacea can assist in the treatment of Despite being cold, it won't stop one. Additional uses for Echinacea in opposition to numerous different ailments, such as urinary infections in the urinary tract, vaginal yeast infections, genital herpes gum disease, septicemia (bloodstream infections),syphilis, typhoid, tonsillitis, streptococcus infections, cholera and diphtheria. One of the most widely used widely used herbs and have been thoroughly researched for their immunity-related effects It has served as a immunity booster for a range of illnesses, including the flu and colds. The benefits of Echinacea are heavily having the capacity to "boost" the immune system [29][30].

GARLIC:-

Common name:- Lasan,Allium

Biological Source:-

Garlic is the ripe bulb of *Allium sativum* Linn.

Family:- Liliaceae.



Fig 5.Allium sativum

Chemical constituents:-

The drug's active ingredient is a yellow liquid called allicin, which gives garlic its distinctive odour. It is miscible with benzene, ether, and alcohol and breaks down during distillation. Alliin, fatty and volatile oils, mucilage, and albumin are some of the additional components of garlic that have been identified. Another active ingredient is alliin, which is odourless, crystallises from aqueous acetone and is almost completely insoluble in chloroform, acetone, ether, and benzene. An aroma of garlic arises upon cleavage by the particular enzyme alliinase, and the fission products have antibacterial activity comparable to that of allicin. Allicin, diallyl disulphide, and allyl propyl disulphide are found in essential oil (0.06-0.1%). Garlic is used to isolate glutamyl peptides. Leucine, methionine, S-propyl-L-cysteine, S-propenyl-L-cysteine, S-methyl cysteine, S-allyl cysteine sulphoxide (alliin), and S-ethyl cysteine are the amino acids found in the bulb.

Uses:-

The primary component of garlic that kills bacteria. The greatest technique to boost immunity with allicin and garlic consume it uncooked to give it a boost. Garlic when chewed releases The mouth releases allicin, which the body then absorbs[31].

It is a bulbous-rooted, perennial plant with a potent odour. A garlic decoction is utilised for chest, cough, and asthma-related issues. Plants have therapeutic qualities including antiviral, antioxidant, anti-inflammatory, Alzheimer's disease and cancer-fighting[25].

TURMERIC:-

Common name:- Saffron Indian, haldi, Curcuma, Rhizoma cur-cumae.

Biological Source:-

Turmeric is the dried rhizome of *Curcuma longa* Linn. (syn. *C.domestica* Valetton).

Family:- Zingiberaceae.



Fig 6. *Curcuma longa*

Chemical constituents:-

Turmeric powder comprises 60 to 70% carbs, 6 to 13% water, 6 to 8% protein, 5 to 10% fat, 2-7% dietary oils, 3-7% dietary minerals, 1-6% curcuminoids, and fibre. Mono and sesqui- terpenes such as zingiberene (25%), -phellandrene, sabinene, turmerone, arturmerone, borneol, and cineole can be found in volatile oil. Tolylmethyl carbinol is thought to be responsible for the essential oil's choleric effects.

Uses:-

One of the highest food sources of iron is turmeric (67.8 mg/100 g). milli grammes of turmeric powder per 100 g. 3 g of one teaspoon of Iron is provided by 2 milli grammes of turmeric powder. Iron is crucial. Turmeric has great capacity for boosting immunity. Alzheimer's disease, diarrhoea, jaundice, liver problems, and urinary problems can all be treated with iron. The rhizome, which is aromatic, stimulant, antiperiodic, and carminative, is used for these purposes.

Turmeric contains a molecule called curcumin, which is yellow-orange in colour. It has been discovered that curcumin has nematocidal and parasite-growth-inhibiting effects. Curcumin assists in reducing cholesterol levels and immune cell homeostasis are aided by the fact that all immune cells have cholesterol receptors throughout the immunological reaction[25][32][33].

GINGER:-

Common name:-Adarak, Rhizoma zingiberis, Zingibere..

Biological source:-

The rhizomes, which are roscoed and dried in the sun.

Family:- Zingiberaceae.



Fig 7.Zingiber officinale

Chemical Constituents:-

1 to 2% volatile oil, 5 to 8% pungent resinous substance, and starch are all present in ginger. The drug's pungent flavour comes from gingerol, a yellowish oily substance that is odourless and is responsible for the drug's fragrant odour. Sesquiterpene hydrocarbons like "zingiberol," "sesquiterpene alcohol," "bisabolene," "farnesen," and "sesquiphellandrene" make up volatile oil. There are also less acidic ingredients like shogaol and gingerone. Shogal is created when gingerol is dehydrated and is absent from fresh rhizomes[34].

Uses:-

Due to its anti-inflammatory and antioxidant properties, ginger can help strengthen the immune system. In fact, consuming a cup of ginger tea or ginger kashayam first thing in the morning may prevent disease and strengthen the immune system. Fresh rhizome juice mixed with honey is used as a cough and asthma treatment. The rhizome of ginger has a flavouring ingredient with a strong aroma and a warm, spicy flavour. a medical experiment when done on male endurance athletes who received ginger rhizome powder for six weeks indicated a significant reduction in fatigue. C-reactive protein and tumour necrosis factor levels are lower[25][35].

AMLA:-

Common name:- Emblica, Indian gooseberry.

Biological Source:-

This consists of dried, as well as fresh fruits of the plant *Emblica officinalis* Gaerth (*Phyllanthus emblica* Linn).

Family:- Euphorbiaceae.



Fig 8. *Emblica officinalis*

Chemical constituents:-

37% of emblicanin A, 33% of emblicanin B, and Pedunculagin (14%) and punigluconin (12%). Additionally, punicafolin and phyllanemblin A are found in amla. other polyphenols, such as flavonoids, phyllanemblin, Gallic acid, ellagic acid, and kaempferol. The fruit itself of *E. officinalis*. It also includes a variety of phytoconstituents, including increased amounts of minerals, vitamins, amino acids, fixed oils, gallic acid, ellagic acid and other polyphenols oils, as well as flavonoids such as rutin.

Uses:-

Amla is a berry high in vitamin C that increases the body's creation of white blood cells (WBC) aid in the treatment of several illnesses and infections. In Amla, further more abundant in calcium, iron, and several other minerals which produce the fully nutrient-dense fruit. In Amla, likewise beneficial for controlling diabetes and lowering cholesterol levels [36][37].

ALOE VERA:-

Common name:- Aloe, Ghrikumari

Biological Source:-

Aloe is the dried juice collected by incision, from the bases of the leaves of various species of Aloe. *Aloe perryi* Baker, *Aloe vera* Linn or *Aloe barbadensis* Mil and *Aloe ferox* Miller.

Family:- Liliaceae.



Fig 9. Aloe barbadensis

Chemical constituents:-

Sugars, lignin, saponins, enzymes, minerals, vitamins, Acids salicylic and amino. It includes vitamins. Antioxidants C and E, including (beta-carotene). It also choline, folic acid, and vitamin B12 are all present.

Uses:-

Support the cardiovascular and immunological systems. Aloe Vera includes vitamins, minerals, and amino acids[38].

TULSI:-

Common name:- Sacred basil, Holy basil.

Biological Sources:-

Tulsi consists of fresh and dried leaves of *Ocimum sanctum* Linn.

Family:- Lamiaceae.



Fig 10. *Ocimum tenuiflorum*

Chemical constituents:-

Bright, yellow-colored, and pleasant volatile oil (0.1 to 0.9%) is present in tulsi leaves. Depending on the drug's type, region of cultivation, and time of collecting, the oil content varies. The oil is extracted from the leaves and blooming tops using the steam distillation process. There are roughly 70% eugenol, 3% carvacrol, and 20% eugenol-methyl-ether in it. Furthermore,

caryophyllin is present. Fixed oil with strong drying qualities is found in seeds. Alkaloids, glycosides, saponin, tannins, a significant amount of vitamin C, and traces of maleic, citric, and tartaric acid are also said to be present in the plant.

Uses:-

Tulsi is very effective for treating bacterial and fungal infections and immunological conditions such as asthma and allergy. Defining the advantages of Tulsi, According to Haritha, it is abundant in vitamin C and zinc and serves as a strong immune system naturally.

Keeping a Tulsi plant indoors can help shield you from some illnesses and infections such as the common cold, the flu, and viral infections. These potent antibacterial and disinfecting Tulsi is a great plant for a variety of reasons, in addition to these to strengthen your defences[39].

NEEM:-

Common name:- Nimtree, Indian lilac

Biological Source:-

Neem is made up of either fresh or dried oil from seeds and leaves of *Azadirachta indica*.

Family:- Meliaceae.



Fig 11. *Azadirachta indica*

Chemical constituents:-

Neem leaves :Azadirachtin, meliacin, quercetin, and other compounds found in Nembosterol, ascorbic acid, carotenoids, amino acids, etc.

Neem seed: Azadirachtin

Neem kernels: oil of margosa

Neem barks: Nimbin, Nimbinine, Nimbidine,"nimbosterol, nimbidol, and margosin.

Uses:-

Neem is calming and strengthens your immune system. internal parts of your body. It has antibacterial and anti-fungal qualities that maintain your healthy, clear, and glowing skin. Neem provides additional blood-purifying qualities.

Neem possesses blood-purifying qualities as well, increasing both immunological systems that are cell- and lympho mediated. High fevers, malaria, the flu virus, dengue, and other infectious disorders can be avoided by taking neem capsules. Terpenoids, often known as terpenes, come in more than 70 varieties identified in several Neem tree components. one distinct Beta-caryophyllene, a neem terpenoid, has been demonstrated to possess anti-inflammatory, antioxidant, and painkilling properties benefits. Nimbolide, azadirachtin, and gedunin are among the limonoids that make up one-third of the over 300 structurally different constituents agents that alter cell signalling pathways[40].

GULVEL:-

Common Name:-Amrita, Giloy, Guduch.

Biological Source:-

It Consist of dried, matured species of stem of *Tinospora cordifolia* Miers

Family:- Menispermaceae.



Fig 12. *Tinospora cordifolia*

Chemical constituents:-

N-methyl-2-(11-hydroxymustakone) and Cordifolioside A, pyrrolidone, N-formyl annonain, Magno florine, syringing, and tino cordiside.

Uses:-

Tinospora cordifolia Extracts from cordifolia are widely utilised in numerous natural remedies for a variety of diseases maladies due to its anti-periodic, anti-spasmodic, antimicrobial, anti osteoporotic, anti inflammatory, anti-allergic, and anti-diabetic characteristics. Traditional medicine values the use of *Tinospora cordifolia*. Ayurvedic medicine has been used for centuries to treat bone fracture, pain, asthma, skin condition, poison, jaundice, chronic diarrhea, cancer, dysentery, and chronic gastrointestinal illness Insect, snake, and eye conditions.

It makes a difference in how active to those cells that combat foreign invaders are called macrophages(body as well as microbes), which aids in early recuperation. The anti-inflammatory properties of giloy are extremely well-known, and it also aids in respiratory many coughs, colds, and tonsils. For additional skin treatments, try Giloy powder, Kadha (tea), or pills.

poisons from the body without any issues. It has pharmacological characteristics as well. liver protection, hepatoprotective, and immunomodulation hypoglycemic[41].

BLACK PEPPER:-

Common name:- Madagascar pepper, King of Spice

Biological Sources:-It is obtain from the fruits of plant Piper Nigrum

Family:- Piperacea.



Fig 13.Piper nigrum

Chemical constituents:-

The main active constituents of the Piper Nigrum is Pinpene, Terpinene.

Uses:-

Since Piper nigrum extensively investigated for its biological attributes and phyto-active bioactive substances. It is overflowing with antibacterial characteristics, which prevent keeping diseases at bay while also offering comfort from discomfort. It serves both human and veterinary purposes. Medication for gastrointestinal illnesses, menstrual disorders, and human ear-nose-throat disorders is available in India[42].

In, Numerous ayurvedic texts indicate qualities including anti-oxidant, anti-inflammatory, immunomodulatory, and antineoplastic, Pro apoptotic and fruit powder is also used to treat digestive disorders. black pepper. Aqueous extracts exhibit an anti-oxidant and anti-inflammatory response by lowering the degree of nitric acid generation[43].

CAT'S CLAW:-

Common name:-Samento, Peruvian liana, una de gato

Biological Source:-

Cat's claws come in two major varieties that are widely used Uncaria guianensis and Uncaria tomentosa.

Family:- Rubiaceae.



Fig 14. *Uncaria tomentosa*

Chemical constituents:-

The oxindole alkaloids in this category include rhycho phylline, compounds such as iso pteropodine, allo iso pteropodine, and Phytosterols such as beta-sitosterol, uncarine, quinovic acid, and proantho cyanidins, as well as These substances: catechin tannins, stigmasterol, and campe sterol.

Uses:-

Many studies have demonstrated that it improves immunity, gastrointestinal and intestinal conditions, making it a popular option for treating Acquired Human Immunodeficiency Syndrome (AIDS) and Cancer[33]. These substances have immune-stimulating, antibacterial, antitumor, allergy, and ulcer-fighting, anti-inflammatory, anti-oxidant, and adaptogen qualities[44].

ONION:-

Common name:-Bulb onion, Common onion

Biological source:-

It is derived from the plant *Allium ascalonicum*. The most popular variety of the *Allium* genus is the bulb onion, a vegetable.

Family:- Amaryllidaceae.



Fig 15. *Allium cepa*

Chemical constituents:-

Onions are the source of several phytochemicals, such as polyphenolic chemicals, phenolic acids, flavonoids (fisetin, quercetin), ascorbic acid, and sulphur compounds. a member of the monocotyledon family, which includes thousands of species such as onions, chives, and garlic[45].

Uses:-

Allium cepa is used in a treatment for nasal congestion made from natural ingredients. besides strengthening the immunological system. Onion includes Sulfur, zinc, selenium, vitamin C, and most crucial quercetin, These strong minerals boost your immune system. stronger and healthier system. Flavonoids, as well as quercetin's antioxidant component is bursting with antiviral properties. The vegetable has a lot of vitamin C, a nutrient important for maintaining immunological function. Further, these selenium, a trace element that boosts immune response is more abundant in onions than other vegetables. Selenium could assist in the treatment of inflammatory and allergic viruses[45][46].

CLOVE:-

Common name:- Clove buds, Clove flowers.

Biological source:-

Clove consists of the dried flower buds of *Eugenia caryophyllus* Thumb.,

Family:- Myrtaceae.



Fig 16. *Eugenia caryophyllus*

Chemical constituents:-

Clove contains between 14 and 21% volatile oil. The additional constituents are eugenol, acetyl eugenol, gallotannic acid, two crystalline principles, caryophyllenes, methyl furfural, gum, resin, and fibre. Comparable to a phytosterol but without an odour, caryophyllin is distinct from eugenol, a colourless liquid. Clove oil contains 60–90% eugenol, which is what gives it its anaesthetic and antibacterial properties.

Uses:-

As an antibiotic, stimulant, carminative, aromatic, and flavouring agent, clove is utilised. Antiemetic and anodyne are further uses for it. Clove oil is used by dentists as a root canal disinfectant and as an oral anaesthetic. Clove is used to treat diarrhoea, intestinal worms, and other digestive disorders because it kills intestinal parasites and has wide antibacterial capabilities against fungus and bacteria. Clove oil can relieve dental pain. Eating cloves is claimed to have aphrodisiac properties, and a few drops of the oil in some water will stop vomiting. In tiny doses, eugenol is also employed as a local anaesthetic. The oil induces

peristalsis and is an effective expectorant for bronchial issues in addition to being a potent germicide. Alkalies and aromatics can be transported well by the infusion and clove water[47][48].

WILD CARROT:-

Common name:-Bee's Nest-Plant, Bird's-Nest, Devil's Plague, Queen Anne's Lace

Biological source:-

It is derived from the plant *Daucus carota*.

Family:- Apiaceae.



Fig 17. *Daucus maritimus*

Chemical constituents:-

Wild carrots include four different classes of phytochemicals: phenolic compounds, carotenoids, polyacetylenes, and ascorbic acid.

Uses:-

The crucial oils derived from *Daucus carota* L. roots and flowers. *Daucus maritimus* were distilled and hydro distilled to produce them by combining gas chromatography and mass spectrometry Carbon-nuclear magnetic resonance and spectrometry. They inhibited bacterial growth as a result of their antibacterial activity. a number of typical human pathogenic microorganisms, as well as a few ecologically and clinically separated strains with noteworthy Minimal inhibitory concentration and Minimum bactericidal concentration[49][50].

3. Conclusions:-

The herbs and herbal plant used in Indian cuisine identify and bind to a particular receptor, which has an during an infection, immunomodulating effects. Still, some plant extracts elicit vague reactions. Many items made from plants are consumed everyday, which could strengthen the immune system and keeps the body in good shape. Utilizing immunomodulators found in common kitchen herbs for medicinal purposes since medicines with improved dosage can be more efficient. Therefore, it is crucial to research the precise herbal formulation's mechanism, which can keep the body in balance without endangering it through excessive use, activation in future of the research.

VARIOUS HERBS AND HERBAL PLANT THAT BOOST THE IMMUNE SYSTEM IN THE FOLLOWING WAYS:-

- Improves immunological function

- Activates the body's natural defences to eliminate hostile viruses, bacteria, allergies, and micro organisms both parasites
- Increases intestinal immunoglobulin proteins combat plan against alien invaders
- Has antioxidant properties
- Encourages DNA repairing

Nature's Immune Stimulator will thereby improve the body as a whole, assisting in improving life quality

A PART FROM DIET WE NEED TO FOLLOW CERTAIN RULES AND REGULATION FOR MAINTAIN AND IMPROVING HEALTH:-

- Avoid smoking
- Consume a lot of fruits and veggies.
- Regular exercise
- Keep a healthy weight.
- If you consume alcohol, do it only occasionally.
- Get enough sleep
- Take precautions against infection by washing your
- regular hand washing and meticulous meat preparation

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