

Immunoboosting Formulation

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Submitted: 01-04-2023

Accepted: 08-04-2023

ABSTRACT: Ayurveda claims that a number of drugs stimulate the immune system. Numerous Rasayans have been studied scientifically, and it has been shown that they have anti-inflammatory and immunomodulatory characteristics. Ayurvedic Immuno Booster, for instance, can increase the amount of white blood cells in the immune system and train them to combat pathogens. There are several ways that immune stimulants work. The Ministry of AYUSH's advice to take Ayush Kwatha and the other single herbs is supported by excellent preclinical research. A brief observational study found that guduchi and turmeric had a positive influence on COVID-19 prevention. It's a myth that conventional Ayurvedic treatments won't

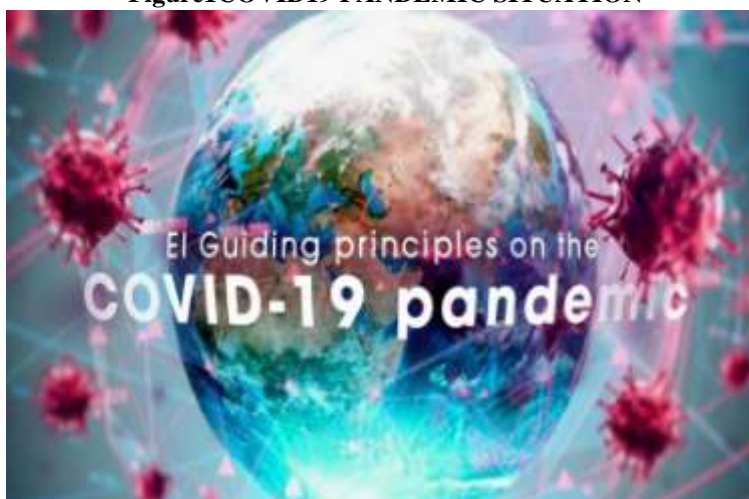
make you more resistant to the virus; in reality, Ayurveda may make you more resilient to COVID-19. As an immune booster for COVID-19 prevention and treatment, the Ministry of AYUSH has recommended using Ayushkwatha, a concoction of holy basil leaves, cinnamon bark, ginger rhizomes, black pepper, and a single herb called Guduchi Haridra milk. Since they are safe and effective for COVID-19 prevention and treatment, the Ministry of AYUSH suggests Ayushkwatha and individual herbs like Guduchi and Haridra milk as immune boosters.

Keywords: Rasayans, immunomodulator, COVID-19

I. INTRODUCTION:-

1.1 Covid– 19 Pandemic Situations:-

Figure 1 COVID19 PANDEMIC SITUATION



In covid 19 pandemic situation in india is a part of the world wide pandemic of COVID - 19 caused by severe acute respiratory syndrome corona virus 2. Immuno-boosting is a topic of discussion among regular residents in the COVID-19 pandemic emergency and is mostly seen in social, press, and electronic media. The general public wants to utilise it with high expectations for corona

virus prevention and treatment. As a result, rather than treating already existing illnesses, there is a rising need for ayurvedic immuno-boosters (AIB) to enhance the immune system and prevent coronavirus infection. Several endeavours have been done to use the huge potential of Ayurveda in this epidemic in response to the need in India. A list of recommendations for enhancing immunity

and taking care of oneself using Ayurvedic principles has been made public by the Ministry of AYUSH. The AYUSH system is now in greater demand nationwide and is prepared to be called upon at any time to serve the country.

II. IMMUNO BOOSTING:-

2.1 IMMUNITY:-

Immunity is a defence process that helps an organism maintain its homeostasis and health in the face of dangerous infections and environmental contaminants. This is kept up by a network of cells, tissues, organs, and biochemical defence mechanisms created to protect the organism from outside intruders that can endanger its integrity. Immunity is the ability to recognise one's own cells or tissues and to reject outside protein molecules or environmental microorganisms.

Epidemiological statistics showing an increase in immunological illnesses over the past 20 years led to the development of a new field of pharmacology termed immuno-pharmacology and a new class of chemicals used in immunotherapy known as immune modulators.

1.2 IMMUNO MODULATOR (IMMUNO BOOSTER):-

Immuno-modulators are a particular class of molecules that, in immunological-mediated diseases and infections, either promote or decrease the immune response. While immune stimulatory medications are used to treat or prevent infection, immunosuppressive drugs are widely used to reduce the immune response in many immunological-mediated disorders. Immuno booster/buster are synonyms for immune stimulants. Vitamins, minerals, probiotics, and functional foods are immune boosters, as are conventional drugs and methods that strengthen the immune system to treat and prevent illness.

The idea of vaccination is a well-known and efficient approach to improve immunity and ward off sickness. Ayurveda is a functioning conventional medical system that has been in continuous use for three thousand years. When a new ailment first emerged, its guiding principles and methods—which included the oral administration of preventative medications, herbs, formulas, decoctions, indoor herbal medicine fumigation, etc.—were advised for successful prevention and treatment.

The subclinical and clinical evidence for immune pharmacology and Rasayana botanicals is examined from the most recent medical literature.

1.3 IMMUNE SYSTEM:-

The network of cells, tissues, organs, and biochemical mediators that protects the body is known as the immune system. Phagocytic cells and lymphocytes make up the immune system. The majority of white blood cells that can take in and digest foreign organisms are called phagocytic cells, and they include neutrophils, mast cells, macrophages, and monocytes. Lymphocytes, often known as B and T cells, are the second most common kind of cell. Again, cytotoxic T cells kill cancerous or infected cells, whereas helper T cells control T cells' activity. Natural killer cells eliminate cancerous or unhealthy cells.

The bone marrow and thymus are the basic lymphoid organs, whereas the lymph nodes, spleen, tonsils, and Peyer's patches in the small intestine are the secondary lymphoid organs. Additionally, a group of proteins known as a complement cooperate with antibodies. A cytokine is the immune system's chemical messenger. Lymphokines, as opposed to monokines, are released by monocytes and macrophages, and they trigger the release of T and B lymphocytes. Cytokines increase cell activation, enhance cell proliferation, and kill target cells. Interferon, interleukin, and chemokines are the cytokines.

1.4 IMMUNO RESPONSE :-

Immuno response is traditionally classified as innate and adaptive immunity.

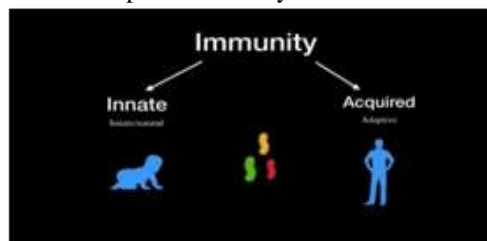


Figure2 IMMUNO RESPONSE

In contrast to adaptive immunity, which is a long-term response that comprises an antigen-specific system mediated by memory cells and their specialised receptors, innate immunity is a short-term reaction that includes phagocytic cells, the complement system, and receptors (TLRs, PPPs). It is also known to be acquired as a particular antigen deliberately employed to elicit an immunological response.

Through antigen, MHC, and cytokines, innate immunity detects the pathogen and notifies the adoptive system. Well-known humoral and cell-

mediated immune components drove the operation of the overall immune response. The moral response, also known as an antibody-mediated response, develops from phagocytosis to a massive creation of an antibody by plasma cells in order to memorise the particular antigen for subsequent rapid mobilisation of the system. Antigen identification marked the beginning of the cell-mediated immune response.

The moral response, also known as an antibody-mediated response, begins with phagocytosis and is followed by a massive synthesis of an antibody by plasma cells in order to memorise the particular antigen for subsequent rapid mobilisation of the system. The identification

of the antigen was the first step in the cell-mediated immune response. Lymphokines were then released to promote the development of T and B cells and to help the macrophages engulf and kill the microorganisms.

Through antigen, MHC, and cytokine, innate immunity detects the pathogen and notifies the adoptive system. Well-known humoral and cell-mediated immunological components drove the overall immune response.

The immune system does amazing work to protect against the germs that cause illness, but occasionally it falters because of old age, inadequate diet, environmental contaminants, or an unhealthy lifestyle.

1.5 Immunopathology against covid19:-

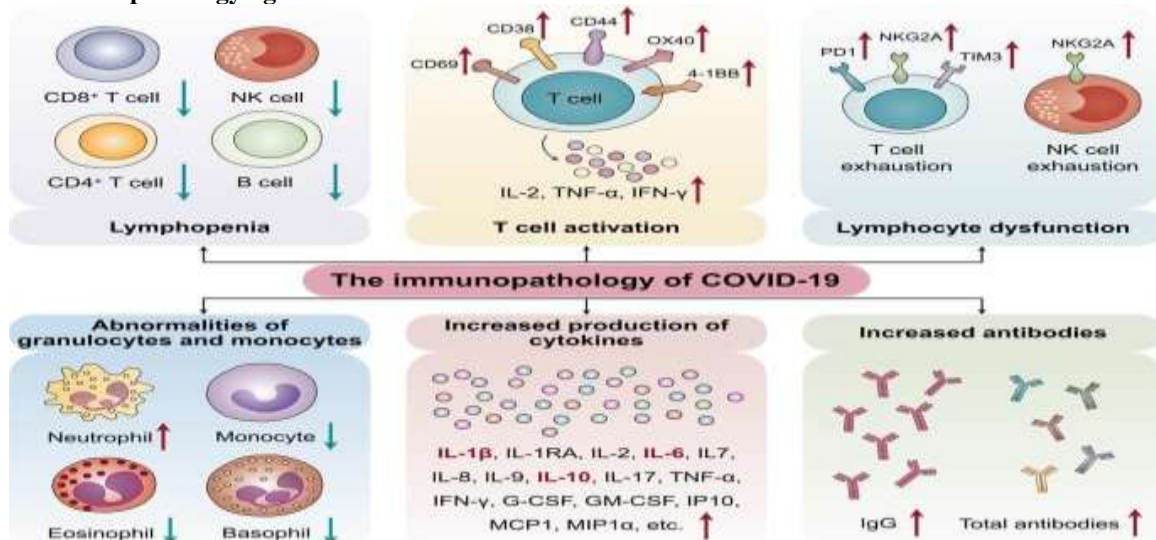


Figure 3 IMMUNOPATHOLOGY AGAINST COVID19

Coronavirus invasion and COVID-19 immunopathology are connected to host immunity. The angiotensin-converting enzyme 2 (ACE2) on the surface of human cells attaches to the spike of glycoprotein (S Protein) on the virus's envelope. The initial line of defence against viral invasion is innate immunity. Following the discovery of pathogen-associated molecular patterns such as RNA and uncapped mRNA, cytolytic immune responses are triggered, mostly by type I interferons (IFN) and natural killer cells. Through activated cytotoxic T cells that kill virus-infected cells and antibody-producing B cells that concentrate on virus-specific antigens, adaptive immunity also plays a significant role in the clearance of viruses from the body.

According to reports, patients with COVID-19, particularly those who have severe

pneumonia, have considerably lower lymphocyte counts and increased plasma concentrations of a number of inflammatory cytokines such as IL-6 and tumour necrosis factor (TNF). According to another study, individuals with severe illness had lower levels of CD4+ T cells, CD8+ T cells, and natural killer cells than patients with moderate disease symptoms. Additionally, a considerable drop in CD4+

The peripheral blood T cell and CD8+ T cell counts of a patient who passed away with Covid 19 infection were also noted. Pro-inflammatory T cell subsets, such as IL-17-producing CCR4+ CCR6+ CD4+ (T-helper 17 or Th17) cells and cytotoxic T cells that express perforin and granzyme, were noticeably enhanced, which may be largely to blame for the extensive

immunological damage in this patient's lungs. A cytokine storm is an abnormal immune activation that occurs during an antiviral immune

response, which is crucial for the eradication of the virus by overproducing inflammatory cytokines that harm the host tissues..

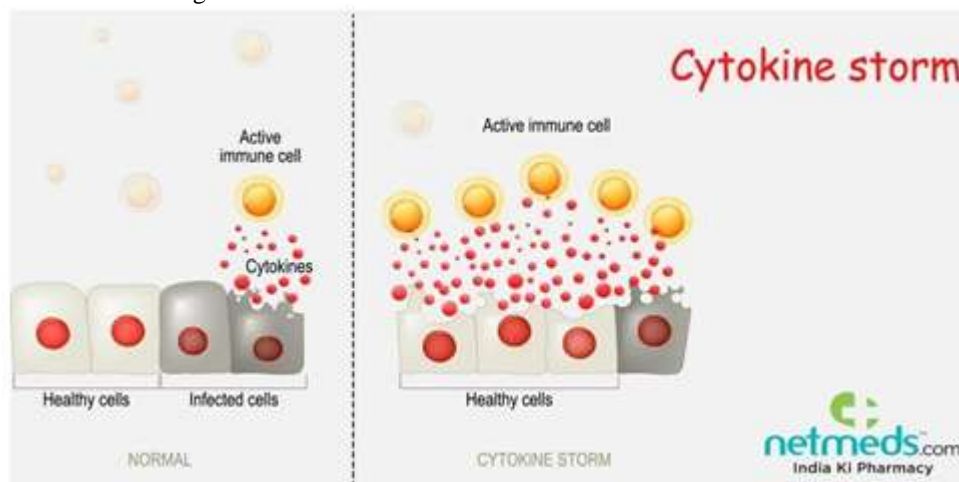


Figure4 CYTOKINE STORM

COVID-19 contains cytokine storm, which is a significant explanation for the development of the illness and final demise. Increased plasma levels of both Th1 (IL-1 and IFN) and Th2 (IL-10) cytokines were also discovered. The plasma concentrations of IL-2, IL-7, IL-10, granulocyte-colony stimulating factor, IFN-induced protein-10 (IP-10), macrophage chemo attractant protein-1, macrophage inflammatory protein-1, and TNF were greater in patients admitted to the intensive care unit (ICU) than in non-admitted patients.

III. MECHANISM OF IMMUNO BOOSTING:-

The mechanism of immune-boosting properties of Rasayanadruugs is not established. Rasayanadruugs have a profound effect on the body system so Immuno booster properties can be discussed as,

- Ayurvedic drug increase digestive power
- Ayurvedic drug produces immune cell & cytokine
- Ayurvedic drug can target covid 19 directly

1.6 Ayurvedic drug increase digestive power:-



Figure 5 AGNI (DIGESTIVE POWER)

Rasayana medications boosted the enzyme response, which enhanced digestion and absorption, and cleared the micro channels to deliver sufficient and suitable nourishment for cellular activity, including immune cell function. Infection activates the immune system, which needs extra calories for a successful immune response. Reduced digestive capacity (Agni) causes ama (undigested food) to be produced, which might lead to a preclinical environment for the beginning of infection or sophia (Chronic infection).11

3.1 Ayurvedic drug produces immune cell & cytokine:-

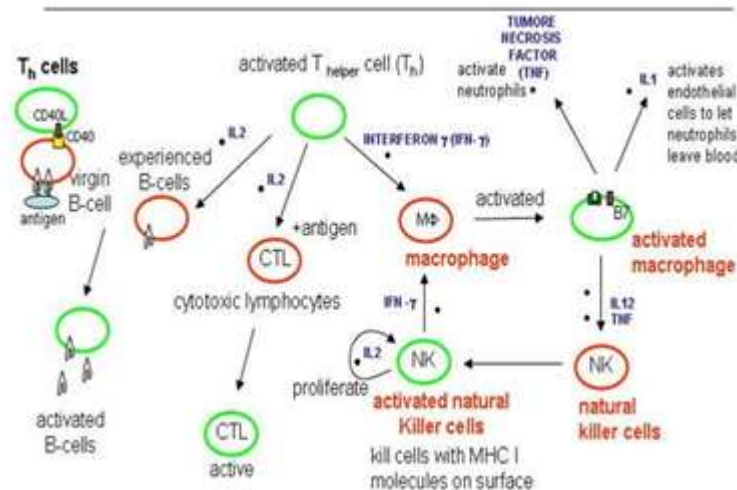


Figure 6 IMMUNE & CYTOKINE

Since rasayana medicines increase the body's ability to fight off infection, they are by nature non-specific. Both innate and adaptive immune responses are how it works. 24 Some Rasayana medications enhance phagocytic activity by boosting the number of PMN, T helper cells,

and NK cells. 25,26 In order to fight off foreign invaders, it also enhanced immunoglobulin proteins in the digestive tract. Additionally, Rasayana reduces stress, anxiety, and sadness, all of which raise cytokines via a psycho-neuro-immune mechanism and modulate mono-amine activity.

3.2 Ayurvedic drug cantarget covid 19 directly:-

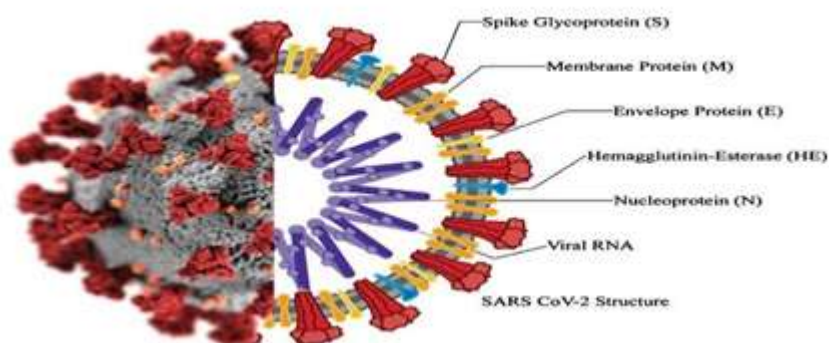


Figure7 TARGET COVID19 DIRECTLY

Rasayana medicines bind to the spike protein, E protein, and N protein, which causes destruction to the coronavirus structure. By interacting with the proteins Nsp1, Nsp 3c, and ORF7, it can reduce virulence. The majority of Rasayana medications work by interacting with the COVID-19 proteases' active site to prevent RNA synthesis and replication.

IV. POTENTIAL AYURVEDIC DRUG HAVING IMMUNO BOOSTING:-

The Ayurveda has placed a strong emphasis on developing mental and physical fortitude to handle a variety of environmental and biological challenges, including illness. similar to both acquired and innate immunity

In the COVID-19 outbreak crisis, the Ministry of AYUSH, Government of India, advised Ayushkwatha, which is made up of holy basil leaf, cinnamon bark, ginger rhizome, and black pepper that is often used in Indian cuisine.

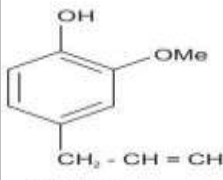
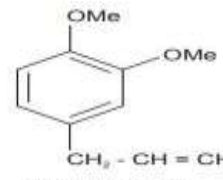
The Ministry of AYUSH also suggests Guduchi extract and Haridra milk as single-drug immuno-boosters.

4.1 HOLY BASIL(TULSI):-



Figure 8 TULSI

Table 1. Monograph of Tulsi

SYNONYMS	:-Holy basil
BIOLOGICAL SOURCES	:-Ocimum Sanctum
CHEMICAL CONSTITUENT	:-Eugenol, Methyleugenol
	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Eugenol</p> </div> <div style="text-align: center;">  <p>Methyleugenol</p> </div> </div>
USES	:-Good Immunomodulatory

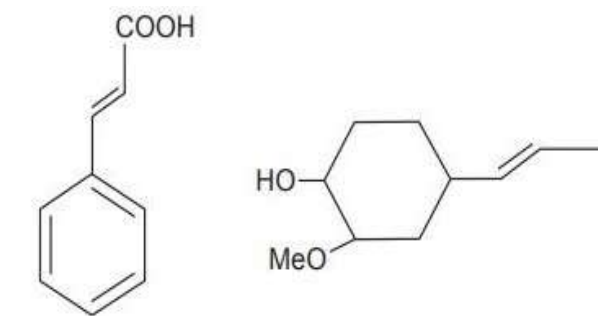
4.2 DALCHINI (CINNAMON):-



Figure9 Cinnamon bark

Table 2. Monograph of Cinnamon bark

SYNONYMS	:- Cinnamon Bark
BIOLOGICAL SOURCES	:-Cinnamomum Zeyanicum

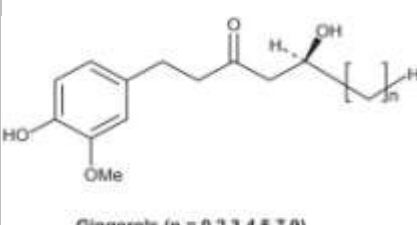
CHEMICAL CONSTITUENT	:-Cinnamic acid, Eugenol  <p>Cinnamic acid Eugenol</p>
USES	:-Expectorant


4.3 SUNTHI (GINGER):-



Figure 10Ginger

Table 3. Monograph of Ginger

SYNONYMS	:-Ginger
BIOLOGICAL SOURCES	:-Zingiber Officinalis
CHEMICAL CONSTITUENT	:-Gingerols, Zingerone  <p>Gingerols (n = 0,2,3,4,5,7,9)</p>

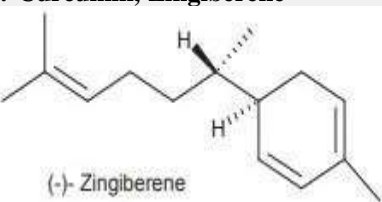
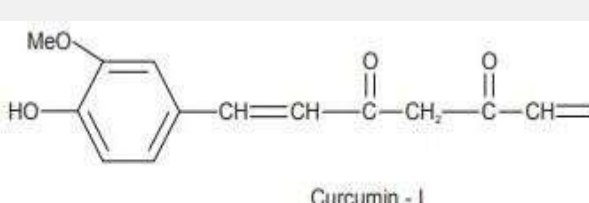
	 <p>Zingerone</p>
USES	:- Antiemetic

4.4 HARIDRA (TURMERIC):-



Figure11HARIDRA

Table 4. Monograph of Turmeric

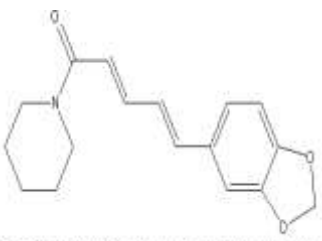
SYNONYMS	:-Turmeric
BIOLOGICAL SOURCES	:-Curcuma longa
CHEMICAL CONSTITUENT	:-Curcumin, Zingiberene  <p>(-)- Zingiberene</p>  <p>Curcumin - I</p>
USES	:- Anti inflammatory

4.5 MARICHA (BLACK PEPPER):-



Figure 12 MARICHA

Table 5. Monograph of Black pepper

SYNONYMS	:-Black pepper
BIOLOGICAL SOURCES	:-Piper Nigrum
CHEMICAL CONSTITUENT	:-Piperidine  <small>1-(5-[1,3-benzodioxol-5-yl]-1-oxo-2,4-pentadienyl) piperidine</small>
USES	:-Increase digestive power

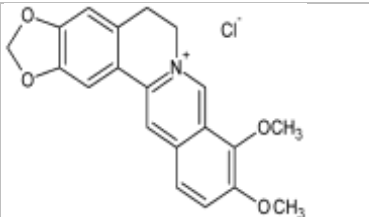
4.6 GUDUCHI (GILOY):-



Figure 13 GUDUCHI

Table 6. Monograph of Giloy

SYNONYMS	:-Giloy
BIOLOGICAL SOURCES	:-Tinospora Cordifolia
CHEMICAL CONSTITUENT	:-Giloin, Berberine

	
Uses	Immunomodulator

Mechanism Of Ayurvedic Drug Having Immune Boosting:-

4.7 HOLYBASIL(TULSI):-

COVID-19 replication is prevented thanks to its ACE II inhibiting and immune-modulating characteristics. Tulsinols (A, B, C, D, E, F, and G) and dihydrodieuginol-B from Ocimum sanctum inhibit the papain-like and main proteases of the SARS coronavirus.

4.8 DALCHINI (CINNAMONBARK):-

Act as a powerful regulator of monocyte/macrophage-mediated immunological responses, maybe by causing thiolation at target enzyme cysteine residues (PDK1 or PI3K).

4.9 SUNTHI (GINGER):-

The rhizome of ginger and its primary compounds, such as gingerols, schools, etc., block the formation of prostaglandins and leukotrienes, cyclooxygenase and lipoxygenase activities, and pro-inflammatory cytokines including IL-1, TNF-, and IL-8 without having a discernible impact on IL-6 levels.

4.12HOLYBASIL(TULSI):-

4.10HARIDRA(TURMERIC):-

Growing evidence from preclinical studies demonstrates that curcumin effectively inhibits viral infection, lessens the severity of lung injury by counteracting the cytokine storm, inhibits subsequent fibrosis, and raises survival rates. Curcumin is an Ayurvedic plant extract with high safety and low toxicity that people take as a diet supplement.

4.11MARICHA(BLACKPEPPER):-

The extract of maricha and its components, such as piperine, control the balance of cytokine production in Th1, Th2, Th17, and Treg cells, reduce the buildup of inflammatory cells, inhibit the expression of GATA3, IL-4, IL-6, IL-1, RORt, IL-17A, and TNF-, increase INF- and IL-10 secretions in BALF (Broncho-alveolar lavage fluid), and promote the proliferation of T and B cells 17

Example Of Immune Boosting Ayurvedic Product & Marketed Product:-

Table 7. Marketed product of Tulsi



AYURVEDIC PRODUCT	MARKETED PRODUCT
<p>TULSIKADHA:-</p>  <ul style="list-style-type: none"> ❖ Tulsileave ❖ Ginger ❖ Turmeric ❖ Blackpepper ❖ Clove ❖ Cinnamonstick ❖ Water 	<p>DABUR TULSI IMMUNITY BOOSTER</p>  <ul style="list-style-type: none"> ❖ Ramatulsi ❖ Shyamatulsi ❖ Vishnatulsi ❖ Nimbutulsi ❖ Vanatulsi

Figure 15TULSIKADHA



4.13 DALCHINI(CINNAMONBARK):-

Table 8 .Marketed product of Dalchini

AYURVEDIC PRODUCT	MARKETED PRODUCT
<p>AYUSH KWATH POWDER</p>  <ul style="list-style-type: none"> ❖ 1) Tulsi ❖ 2) Dalchini ❖ 3) Sonth ❖ 4) Kali mirch 	<p>CHYAVANPRASH HERBAL SUPPLEMENT CAPSULES</p>  <ul style="list-style-type: none"> ❖ 1) Microcrystalline cellulose ❖ 2) Sodium carboxy methylcellulose ❖ 3) Colloidal silicon dioxide ❖ 4) Magnesium stearate

4.14 SUNTHI(GINGER):-

Table 9 .Marketed product of Ginger

AYURVEDIC PRODUCT	MARKETED PRODUCT
<p>• GINGER SYRUP:-</p>  <ul style="list-style-type: none"> ❖ Ginger ❖ Honey ❖ Lemon ❖ Water 	<p>• GINGER DROP:-</p>  <ul style="list-style-type: none"> ❖ Ginger

4.15 HARIDRA(TURMERIC):-

Table 10 .Marketed product of Haridra

AYURVEDIC PRODUCT	MARKETED PRODUCT
<p>TURMERIC MILK :-</p>  <p>golden milk turmeric milk boost immunity in 10 min</p> <ul style="list-style-type: none"> ❖ Turmeric ❖ Milk ❖ Jaggery 	<p>DABURPURE IMMUNITY BOOSTER HALDI TABLET:-</p>  <ul style="list-style-type: none"> ❖ Haldi ❖ Excipientq.s

4.16 MARICHA (BLACK PEPPER) :-

Table 11. Marketed product of MARICHA

AYURVEDIC PRODUCT	MARKETED PRODUCT
<p>BLACKPEPPER KADHA:-</p>  <ul style="list-style-type: none"> ❖ Ginger ❖ Black pepper ❖ Clove ❖ Honey 	<p>AYUSHKWATH TABLET:-</p>  <ul style="list-style-type: none"> ❖ Maricha ❖ Sunthi ❖ Tulsi

Figure19BLACKPEPPERKADHA

4.17 GUDUCHI(GILOY):-

Table 12. Marketed product of GUDUCHI



AYURVEDIC PRODUCT	MARKETED PRODUCT
❖ GILOY JUICE:- 	❖ HIMALAYA WELLNESS PUREGILOY TABLET:- 
❖ Tulsi ❖ Ginger ❖ Giloystem ❖ Lemonjuice	❖ Giloy

Figure 20 GILOYJUICE

V. DISCUSSION:-

According to Ayurveda, several medications have an immunostimulatory effect. Scientific research on several Rasayans has revealed that they have anti-inflammatory and immunomodulatory properties. Ayurvedic Immuno Booster, for example, can enhance the quantity of white blood cells in the immune system and educate them to fight against germs that cause disease. Immune boosters function in many different ways. Excellent preclinical data support the use of AyushKwatha and the other single herbs as recommended by the Ministry of AYUSH. Guduchi and turmeric had a favourable preventative impact on COVID-19, according to a short observational research. The misconception that traditional Ayurvedic medicines won't increase your resistance to the virus is untrue; instead, Ayurvedic medicine might increase your resistance to COVID-19. The Ministry of AYUSH has suggested the use of Ayushkwatha, a mixture of holy basil leaves, cinnamon bark, ginger rhizomes, black pepper, and a single herb called Guduchi Haridra milk, as an immuno-booster for COVID-19 prevention and treatment.

VI. CONCLUSION:-

The Ministry of AYUSH recommends Ayushkwatha and single herbs like Guduchi and Haridra milk as immuno-boosters since they are secure and efficient for COVID-19 prevention and treatment.

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