iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** VIII **Month of publication:** August 2020

DOI: https://doi.org/10.22214/ijraset.2020.31192

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VIII Aug 2020- Available at www.ijraset.com

A Study on Phytochemical Properties from Bio-Resources to Enhance Immunity and Control Viral Disease

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Abstract: ***Bio-resources are resources that are organically obtained and can be easily synthesized. These are the compounds that are extracted through plants or an organic sources for instance phytochemicals. Naturally occurring compounds are known as phytochemical. Phytochemicals are also called phytonutrients, they are found in fruits, vegetables, whole grains, legumes, beans, seeds etc. They are classified and studied according to their functional properties and chemical structures. Phytochemicals are compounds that involved in plant metabolism or rather they are the secondary metabolites of the plant. These metabolites help the in various things. Ealier medicine relied on the prescription of specific plants and herbs for healing, a practice still supported by contemporary research. Phytochemicals plays self-reparative functions and support incredible defensive in the body. Due to this they are evolved for optimum functioning in body's immune systems. They boost immune system and are anti-inflammatory and also have antioxidants property. To inhibit viral replication phytochemicals have potential by regulating viral adsorption, cell receptors binding, and inhibition of virus penetration into the host cell and by competing for pathways of activation of intracellular signals.***

Keywords: ***functional properties, chemical structures, secondary metabolites, immune systems, antiviral properties.***

I. INTRODUCTION

From ancient times man has been totally dependent on plant sources the required needs [1]. According to World Health Organization more than 80% of the world's population is dependent on traditional plants for health benefits [2]. Large number of plants in the traditional medicine has now become a part of modern world. Due to growth in modern biology, from natural sources drug discovery has involved highly in multidisciplinary field utilizing various sophisticated methods of isolation, analysis, and evaluation. Last few years natural products have been studied for anti-infective and especially for antiviral activities. Researches carried out using various biological systems suggest the plant-derived natural phytochemical compounds against various viral infections [3] - [4].

During recent years viral diseases causes pandemic has forced the scientist to research less toxic compound for antiviral as the medicine use to combat the virus are harsh on the patient and hence it has forced scientist to use less toxic compounds so instead of using toxic compound as antiviral therapeutics phytochemicals are used. Plants and lots of their secondary metabolites due to the healing properties are in traditional use throughout the planet since past. Phytochemicals provide us diverse bioactive which plays synergetic role in maintaining human health [5].Various infectious viral diseases have been reported till now and newer ones are occurring frequently [6]. Viral diseases like influenza, HIV, Chikungunya and some other viral diseases are caused by alpha viruses and flavi viruses are emerging with the high risk. Now recently, Coronavirus disease caused by a newly identified virus has become pandemic, and affected world severely [7]. Thousands of years ago to prevent and to treat various diseases natural plants was been used as these properties are now attributed to the abundance of phytochemicals.

A strong, well-functioning system is that the cornerstone of excellent health. Immunity is understood as balanced state of getting adequate biological defenses to fight against any type of infection, disease, or other unwanted biological invasion while having tolerance to avoid allergy and autoimmune diseases. Immunity is the body's defense system it has a huge arsenal of weapons to combat against everything it has varied types such as innate acquired active and passive they immune system categories the threat and reacts to it specifically basically it is the first line of defense for our biological systems Research has focused on a group of bioactive chemicals shows to enhance immunity. Phytochemicals present in plant may stimulate the immune system. To enhance the immunity naturally by phytochemical they are consumed as food. As this phytochemical helps in body development, maintenance and modulating immune function.

II. MECHANISM OF PHYTOCHEMICAL TO CONTROL VIRAL DISEASE

A. *Flavonoid as Antiviral*

Flavonoid has capacity that helps to block attachment and entry of viruses into cells. At various stages interfere with viral replication processes or translation and polyprotein processing to prevent the release of mechanisms. Based on mechanisms of antiviral action, flavonoids can be prophylactic inhibitors, therapeutic inhibitors or indirect inhibitors by interaction with the immune system. Flavonoids are divided into several classes such as anthocyanidins; flavones, flavonols, flavanones, flavan, isoflavanoids, and bioflavonoids. Flavonoids that inhibit viral activity can be further divided into the following sub-categories.

1) At specific extracellular regions flavonoids binds and such as viral proteins present on the capsids.
2) Replication inhibitors at early-stage.
3) Transcription and translation blockers.
4) Inhibition of late stages of maturation such as inhibition of assembly/packaging and release.

Flavonoids that can inhibit viral infections by interfering with host factors that are required for successful infection or modulating the immune system to reduce the viral load. [8].

B. *Alkaloid as Antiviral*

Various researchers have studied the effect of alkaloids on viral disease. The studies revealed that about 40 alkaloids possess antiviral properties. There are different types of alkaloid that perform different functions from each other such as Leurocristine they are active against mengovirus extracellular virucidal, poliovirus, vaccinia, and influenza viruses. Periformyline inhibits poliovirus type viruses. Perivine Exhibits polio extracellular virucidal activity against vaccinia. Vincaleucoblastine possesses extracellular virucidal activity against polio virus vaccinia and influenza virus. Columbamine, Berberine, Palmitine inhibitors alkaloids against HIV-1 etc. [9].

C. *Terpenoid as Antiviral*

In terpenoid specifically monoterpenoids have shown antiviral properties. Monoterpenes consist of 10 carbon atoms with two isoprene units and molecular formula C10H16. They are naturally present in the essential and fixed oils of plants and related sources. Monoterpenes are structurally divided into the acyclic, monocyclic, and bicyclic type of compound. The compounds belong to this class usually have strong aroma and odor and are used in many pharmaceutical companies**.** Monoterpenes show antiviral activities and are shown to be quite effective monoterpens such as beta pinene and limonene have shown promising results against hepes simplex virus or HSV1 it has proved very effective against the HSV1 which is resistant to acyclovir [10].

D. *Tannin as Antiviral*

Tanin is an astringent chemical. Tannins have shown promising results against many viruses such as HSV1 HIV. Tannins have shown inhibition in replication of the virus Tannins can also target virion that attached to the periphery of the cell. Tannins is said to be against at every stage of the replication and can also specifically target the infected cell many virus such as herpes simplex vesicular stomatities virus sendpai virus it has also shown result again non enveloped virus such as poliovirus, coxsackievirus, adenovirus, rotavirus, feline calicivirus, and mouse norovirus.[11].

III. MECHANISM OF PHYTOCHEMICAL TO ENHANCE IMMUNITY

Natural compounds with potential immunostimulating activity can be classified as high- and low-molecular compounds. Phytochemical such as Alkaloids, Terpenoids, Phenolic dominate among low-molecular immunomodulatory compounds, polysaccharides dominate among the high-molecular weight compounds [12].

A. *Antioxidant*

Antioxidant compounds are compounds that act against the oxidative radicals oxygen radicals are free radicals that are formed inside the body which do exidatiive damage to the body these free radicals are formed by our metabolic process these can be formed in aerobic exercise as well as while breathing but they are not that harmful but extra free radicals that are formed due to smoking and intensive exercises are damaging to the body, ROS or reactive oxygen species damage body at cellular body they put body in the stress and cause DNA damage and proteins hence antioxidant compounds are essential . Compounds like tannin, phenol, flavonoid, now what these compound do is they act as oxygen scavenging molecules or mediators property of antioxidant activity is said to be due to these compounds they are also known as scavenging molecules they reduce the ROS and mediate the cancellation of the oxidative damage and hence protecting our body against cellular damages such as DNA and protein damage [13].

B. Carotenes

Orange colors are produce by Carotenes**.** They have capacity to protect the thymus gland from damage. The thymuses are an important gland of our immune system and starts to decline from age 20. Carotenes are shown to reinforce the function of several sorts of white blood cells (our immune cells), also as increase the antiviral and anticancer properties of our own system mediators, like interferon [14].

C. Polysaccharides

To enhance immune response and a large number of alkaloids are being investigated for their immunostimulating properties involved to enhance immunity are due to the modulation of innate immunity more specifically macrophage function. Thus, the scientific evaluation of botanical polysaccharides provides a unique opportunity for the discovery of novel therapeutic agents and adjuvants that could act as a beneficial immunomodulatory agent [15].

D. Triterpenoids

Triterpenoids are compounds with a carbon skeleton based on six isoprene units and are derived biosynthetically from the cyclic C30 hydrocarbon, squalene. They are colorless, crystalline, often have high melting points and are optically active substances. The essential triterpenoids are steroids, saponins and cardiac glycolsides which occur mainly as glycosides. Triterpenes especially occur in the waxy coatings of fruit and on such as leaves apple and pear, and they may serve a protective function in repelling insects and microbial attack [16]. Several terpenoids are reported to possess antiarthritic or antiphlogistic activity, and their biological activities appear to be mediated by immunological processes. Effect of these compounds on immune system appears to be two-fold; first to enhance antibody production and second to suppress T-cell response.

E. Sterol

The mixture of sterols and sterolins enhances the cytotoxic ability of NK cells against the target cell line NK 562. It has also been postulated that the sterols in a specific ratio could reinstate a balance between the Th1-Th2 cells, a delicate balance that determines the final outcome of the immune response. In vitro proliferative response of T-cells is enhanced by β- Sitosterol, phytosterols and glycoside stimulated by sub-optimal concentration of phytohaemagglutinin several-fold at extremely low concentrations [17].

IV. DISCUSSION

Due to the newer trend of organic and whole food the trend to use traditional medicine has raised a lot and it is a very good way to combat disease rather than the chemical way as it is less evasive to the body and with little to no side effects in this paper we came along the natural remedies that were less evasive and naturally obtained plants. Eating more amounts of fruits and vegetables are some of the best immunity building things. Eating these helps us to build a protective force field around the body that will help protect against not just acute illness but also other diseases too. Phytochemicals can potentially play important role in immune function. More than 50% of drugs utilized in Western nations taken from bio-resources or their constituents. Phytochemicals of bio-resources also have significant antiviral properties. phytochemical are nothing but secondary metabolites these phytochemicals include Triterpenoids, Alkaloid and Flavonoid these chemicals serve as an helper in the modulation of the immunity and also targeting the virus particularly targeting the replicating phase which helps to diminish the virus to its core. Antiviral treatment sometimes gets very expensive so due this phytochemicals of plants can be savior as it is inexpensive and naturally available. Boosting immunity at home against this viral disease gets easy using bioresourcess.

V. CONCLUSION

From ancient time traditional plant has been used continuously for treatment of viral disease and to enhance immunity. Phytochemicals has always been part of human day to day life. Phytochemicals are used as therapies has it has less side effect and toxicity. Phytochemicals has antiviral and immunity booster properties from bioresourcess. Mechanism of such phytochemical in antiviral and immunity booster is known.

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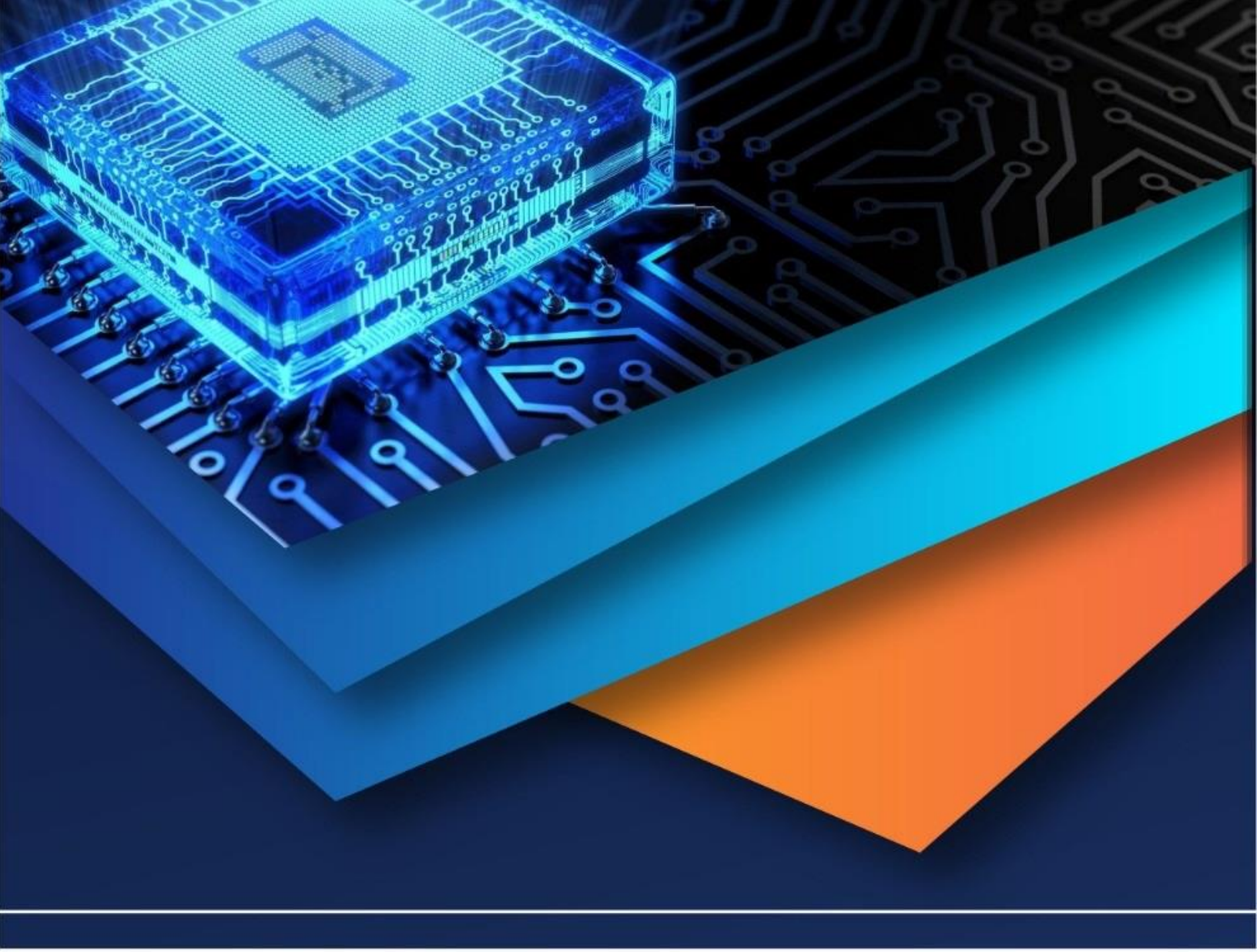

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