

## New Insights in Biological Development of Novel Varieties with Antioxidant, Antimicrobial, Antiparasitic, DNA Protection Activities and Future Perspectives

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### Abstract

Medicinal plants are most valuable source of different natural compounds and safer than the chemicals that directly used for the treatment of high risk diseases. The compounds that present in the medicinal plants are monoterpenes, flavonoids, and phenolics. The ultimate goal of the using of medicinal herbs are inhibiting the growth of the infectious particles that causing variety of diseases. Medicinal plants have been used in order to control the growth of infectious bacteria in as some of them deviling the resistance due to changing endearments for example, *Enterococcus faecium* and *Klebsiella pneumonia*. Many of the plant extracts such as *N.sativa* seeds have been used as natural booster for targeting the lethal pathogens and causing the cellular toxicities While, *Commelina africana* L and *Elephantorrhiza elephantine* that binds with living cells by damaging's the membranes of the toxic pathogens. The production of the free radicals due to stress or any environmental conditions may increase the risk of damage to DNA molecules. These free radicals binds to the double binds of the DNA molecule inhibit their functions in order to replicate for further central dogma processing. It give rise the production of peroxy radicals species due to consecutive attack to the DNA molecule.

**Keywords:** Medicinal plants, Biological activities, cellular toxicities, free radicals , peroxy radicals.

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### INTRODUCTION

Medicinal plants are the most valuable source of the antioxidants, flavonoids, and variety of enzymes. These are natural source for inhibiting the infections caused by the different types of microbes. One the example is the antioxidants ability to interact the microbes in such as way that boost the immunity. These plants also possessing the characteristics such as adsorbing and neutralizing free radicals, by decomposing the peroxides [1, 2]. The byproducts of the free radicals then selected from the body in order to reduce the toxicity problems. There is need to design the natural products that act on the free radicals causing agents because of their increasing interest in the medicinal market and hence increase the overall

agricultural growth of certain crops by promoting the beneficial rhizobacteria. While on the other hand, increasing of the scavenging activity of certain medicinals acting as natural herbs by replacing the toxic chemicals in different ways both in industrial and commercial steps. of free radicals and inhibition of enzymes involved in free radical production [4, 5].

There are different options for extracting the natural products but most of them are costly and less significant due to poor separation of high quality ingredients from the extracts. The extracts of various medicinal plants have been used for treating the different diseases such as diabetes, liver and lowering of the blood pressure but the high use of toxic chemicals in the drugs can cause serious toxicities in

the liver and kidneys. Therefore, the use of medicinal plants has been effective for controlling the large number of infections. Free radicals such as superoxides to produce peroxynitrite that can lead to irreversible damage to cell membranes [3, 4]. The drugs the action on the body can cause serious complications and sometimes leads to side effects such as dizziness, headache, sleep disturbance and psychiatric reactions as anxiety, depression, panic attacks and hallucinations. Sometimes, the antiviral therapy has been causing the effects. Antibiotics drugs are effective in slowing functional decline but do not represent a definite “cure”, forcing the clinician to focus on how to consider a clinical response to treatment. the body as some of the

organs might be disturbed its functions due to long term treatments. Excessive use of antibiotics can also leads the antimicrobial resistance and hence more research needed in order to understand the targeted genes of microbes. The common side effects are usually mild and transient, often settling within days. While, medicinal plants are not causing toxicities in the different tissues of the body and thus safer than the chemicals that directly used for the treatment of high risk diseases. The ultimate goals of the using of the chemicals and medicinal herbs are inhibiting the growth of the infectious particles that causing variety of diseases and changing according the changing environment [2, 4].

**Table-1: Biological development of plant varieties with bioactivities/significance**

Plant/Activities	Role	Biological Significance
Medicinal plants biological development	The extracts of various medicinal plants contain the various natural products viz monoterpenes, flavonoids, and phenolics	Used for treating the different diseases such as diabetes, liver and lowering of the blood pressure but the high use of toxic chemicals in the drugs can cause serious toxicities in the liver and kidneys.
Antimicrobial activity	They are used as medicinal source for controlling the arte of microbial infections. For example, <i>Ethanollic Punica granatum</i> have been used for <i>P. aeruginosa</i> while <i>Melaleuca alternifolia</i> , beneficial for example, to treat acne and other infectious troubles of the skins disease as kills the microbes on the skin that are invaded in skin damaging through activation of the cellular	Plants products have active for controlling the number of infections
DNA protection activities	The natural extract has ability to activate the natural killer cells and these cells also involved in the removal of cellular debris	Several bioactive of the medicinal plants can be screened for use them in plant growth, root development, industrial and many commercial application

The appropriate use of dietary based medicinal supplements helpful for controlling the various diseases associated with liver and hepatic toxicity concerns. This can be use of medicinal plants with properties of antioxidants and flavonoids and some herbal plants, vegetables, and fruits have indicated high potential for outgoing activities of the abnormal cells [5, 6]. *Baccopa monnieri* has been used as source of medicinal plant for the improvement of memory power and treatment of

muscular activities disturbed by the deficiency of the calcium. Its extract or bacosides have also shown anxiolytic effect that has been studied for promoting the health activities of the dietary supplements as a food [7, 8]. When fat molecules react with free radicals, they undergo a process called lipid peroxidation that caused the borne of various disease associated with lipids and metabolism.



**Fig-1: Shows the morphology of the Left *Bacopa monnieri*, Right *Punica granatum***

### Biological Role and Antimicrobial Activities

Medicinal plants have been used in order to control the growth of infectious bacteria in as some of them deviling the resistance due to changing endearments. The most occurring pathogens are *Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumonia*. These bacterial pathogens can be sometime causes of death of many tissues once they growth and colonize in the particular tissues. Several antibiotics have been embayed for controlling their growth but most of them causing the genes in the pathogenic environments leads to the activation of their genes and causes the defective formation of normal genes. Bacterial infections can be controlled at some extent in the form of chemicals either kill them or ingesting their growth such as antibiotics viz as amoxicillin, erythromycin and ciprofloxacin [9, 10].

Secondary metabolites from the plants medicinals are great source of biological activities due to their great potential for targeting the specific disease such as tannins, alkaloids, phenolic compounds, and flavonoids which are acting against the microbial infections caused by bacteria and fungi [8-10, 11]. Several other therapies have been adopted in order to explore the biological extract of the medicinals against urinary tract infections, gastrointestinal disorders, respiratory disease, and cutaneous infections [11, 12]. Some of the experimental studies showed that *Ethanollic Punica granatum* have been used for *P. aeruginosa* while on the other hand, some other type of medicals plants *Thymus kotschyana* have been used against *E. coli*. These studies showed that plants metabolites have active for controlling the large number of infections while on the other hand, chemicals are toxic to the some of the body tissues and causing the cellular toxicities in case of excessive drug administration [13, 14].

Some of the medicinal plants have been used utilized for treating the skin disorders through physical and medial treatments either in the form of nanoformulations or simple preparation of the extracts. One of the example is the example is the *Vaccinium macrocarpon* for infections caused by microbes in respiratory system, urinary tract, gastrointestinal and biliary systems, as well as on the skin. The chemical based natural compounds are potential source of antimicrobials that binds with microbial genes causing the different diseases. The other example is the use of *Melaleuca alternifolia*, beneficial for example, to treat acne and other infectious troubles of the skins disease as kills the microbes on the skin that are invaded in skin damaging through activation of the cellular patterns that links with immunity of the living system and many microbes causing liver and skin toxicities by releasing the variety of the toxins to the extracellular environments [15-17].

The microbiological mechanisms for extraction of plants metabolites increasing the

antimicrobial action of through disrupting microbial membranes. Bacterial biofilms are due to the large quantizes of the toxic wastes released in order to the cause the chronic infections because they show increased tolerance to antibiotics and disinfectant chemicals. Biofilm formation can be formed through the action of micro-colonies resulting into formation of three dimensional structures that disrupt the activities of useful organisms in the food chains. It also disturbed the natural balance between flows of nutrients balance. The formation of biofilm by the bacteria can be controlled through controlling quorum-sensing that is used for treating the bacterial infections has led to the emergence of multiple drug resistant strains. It depends on the binding of the inhibitors to the bacterial surfaces [11, 17-19].

Strong bindings to the bacterial surface disrupt the membranes and bacterial peptides necessary for their biofilm formation. While on the other hand, weak communication through covalent bindings to the bacterial surface unable for discretions of the membranes and bacterial peptides necessary for their biofilm formation. There is need to design the other potential drugs that can binds through biological action in such as way that no toxic effects to the living tissues found for example, through the natural extracts, there is plant based therapies many of the serious infections have been controlled in appropriate manner [20-22].

### Biological Role and Anti-Parasitic Activities

Many of the plant extracts such as *N.sativa* seeds have been used as natural booster for targeting the lethal pathogens and causing the cellular toxicities. As it depends on the certain characteristics features of the attacking pathogens as well as mode of action of the targeted genes. *Chenopodium hookworm* infection that also attack on the living tissues of the skin many of the practices continue in order to explore their biological and cellular effects on the normal tissues. They act in different ways by attacking the body such as *Trichinella spiralis*, the parasitic worm (helminth) that causes trichinosis once enters into the body. The immunity of the body able to activate the formation of pepsin and hydrochloric acid that also lowers the effects of the worms and pathogens. The other plant extracts like crude methanol and methanol have been employed for controlling the high rate of infections caused by the *L. major* and *L. tropica*. Ivory Coast have been acted as medicinal plant because of their action against treating the infections thus used as cellular therapeutic agent for congealing the variety of actions [1, 23].

### Biological Role and DNA Protection Activities

The production of the free radicals due to stress or any environmental conditions may increase the risk of damage to DNA molecules. These free radicals binds to the double binds of the DNA molecule inhibit their functions in order to replicate for further central dogma processing. It give rise the production of peroxy

radicals species due to consecutive attack to the DNA molecule. Due to the electrophilic nature of OH, additions preferentially occur at sites with high electron density. The damage DNA calm also leads the variety of abnormal growth of the cells resisted the profanation of normal that causes metastasis. DNA may be modified in a variety of ways, which can ultimately lead to mutations and genomic instability that including the damage to DNA, including oxidative damage, hydrolytic damage, DNA strand breaks, and others. It also leads the ability of DNA molecule to mutations and genomic instability. This could result in the development of a variety of abnormalities in the different organs such as colon, breast, and prostate. There is need to reduce the production of free radicals species in order to discover their mechanism at biological level [24, 25, 33, 34].

Some of the medicinal plants acting in such as way that genetic material of the cells replicate as they boost the immune system that helpful to fright against the variety of infections. These plants are *Commelina africana* L and *Elephantorrhiza elephantine* that binds with living cells by damaging's the membranes of the toxic pathogens. The use of medicinal plant has been increased due to easy extraction and large number of metabolites can be obtained. These plants are *Memecylon malabaricum* and *Litsea* that showed bioactivities such as quinque flora fatigue, anti-stress, anti-spermicidal, anti-inflammatory and antimicrobial activities [26, 27].

Natural plant based metabolites have been acting for boosting the cellular and immunological processes maintaining the DNA repair that is collection of processes by which a cell identifies and corrects damage to the DNA molecules that encode its genome. The natural extract has ability to activate the natural killer cells and these cells also involved in the removal of cellular debris. Many of these lesions cause the structural damage to the normal molecule of the DNA that is the double stranded and can alter or eliminate the cell's ability to transcribe the gene that the affected DNA encodes. The excessive use of the medicinal plants can cause the serious health problems and cause leads to the abnormalities in the living tissues as cellular debris can cause the cellular toxicities. Therefore, there is need to study the cell based and point to the central dogma of the mononuclear biology. This will helpful for controlling the high rate of cellular toxicities [28-30].

Some species of the medicinal plants have been used for Pharmacologic studies of *Artemisia* as most valuable active compounds in their inner parts that help to fights against the infections, toxins, used for diabetes and inflammatory purposes. These compounds are monoterpenes, sequiterpenes, lactones, flavonoids, and coumarins. The extracts of some *Artemisia* species

have been reported to exhibit the natural components that are involved in boosting the natural immunity [26, 27]. While these compounds binds to the inhibits of the DNA molecules thus showing the most promising effects. The most commonly used plants are (*Achillea millefolium* L.), (*Glechoma hederacea* L.). These chemicals in the specific portion of the plants leads to performs its activities such as inhaling the carcinoma during the progression of the free radicals. These binds to the cells of the oxidants cells and inhibiting their activities for further development. There is need to design the biologically active purification of the plant extracts in order to use them for the pharmacological purposes. In this way, several bioactive of the medicinal plants can be screened for use them in plant growth, root development, industrial and many commercial applications [30-34]. Duplex ultrasound is one of the most advanced technique used for medical imaging due to accurate detection of occlusions in lower limb amputation in patients with chronic limb-threatening ischemia (CLI) because of its high specificity and safety profile. Duplex ultrasound as one of the most reliable and patient safely technique for early detection of lower limb amputation as compared to other traditional ultrasounds [35-40].

## CONCLUSION

Medicinal plants are source of antioxidant, flavonoids and other chemicals that act in such as way that microbial action need to be controlled through use them. Before using them, they are natural products can be purified and passes through industrial processing. They have different applications in the fields of herbal and biopharmaceuticals for the production of large varieties. It also enhances the production of antibiotics in order to resist their resistance. The natural based chemical compounds are most valuable as comforted to the directly use chemicals due to toxicity concerns. Therefore, medicinal plants are safe than the existed of toxic chemicals.

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