

## Phytomedicines: A Two-Pronged Approach for Heart Health — Combating Microbial Disease and Cardiovascular Risk

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### Abstract:

The war on microbial diseases (MD) has hit the world economy. Twentieth-century antibiotics, bed rest, and miracle medicine have played a major role in this treatment of infectious diseases. However, inappropriate, random and irrational use of antibiotics resulted in the appearance of antimicrobial resistance. So the interest in 30 medicinal plants has increased because 30-50% of the existing medicines and nutrients are from plants. The question we address in this review is whether plants produce secondary fertile diversity. Novel antibiotics may be given to control metabolic functions, MD microorganisms, and novel chemo sensitizers. Recover currently used antibiotics. Plants synthesize secondary metabolites and phytochemicals, and have great potential to act as a treatment. The main purpose of this mini review is to highlight the many benefits that come from the plant. Importance of phytochemicals in the development of compounds and biocompatibility therapies. Furthermore, this review focuses on the different effects and efficacy of balm compounds in controlling expectations for promoting MD growth in microorganisms and promoting research on unpredictable plants. Identify new antibiotics for global health benefits.

**Keywords:** Microbial diseases, phytomedicines, polyphenols .

## INTRODUCTION

Herbal medicines derived from plant extracts are being increasingly utilized to treat a wide variety of clinical diseases, mainly in developing countries, for primary health care because of better cultural acceptability better compatibility with the human body and fewer side effects, now a days multiple drug resistance has developed due to the indiscriminate use of commercial antimicrobial drugs commonly used in the treatment of infectious disease [1]. It has been reported that there has been an alarming increase in number of disease and disorders caused by synthetic drugs prompting a switch over to traditional herbal medicine [2]. It is estimated that there are 250,000 to 500,000 species of higher plants on earth. But relatively small percentage (5-15%) has been systematically investigated for the Presence of bioactive compounds [3]. Microorganisms are the Causative agents of almost all kinds of acute and chronic diseases. Plants based antimicrobials have enormous therapeutic potential. They are effective in the treatment of infectious diseases while simultaneously mitigating many of the side effects that are often associated with synthetic antimicrobials. The use of plant extracts with known antimicrobial properties can be of great significance in therapeutic treatments Although hundreds of plant species have been tested for antimicrobial properties, the vast majority of them have not been adequately evaluated [4].

The successive extracts of root, stem, bark, and seeds of *strychnos potatorum* have revealed the presence of flavonoid glycosides, lignins, phenols, saponins, sterols and tannin. The curative properties of medicinal plants are perhaps due to the presence of these secondary metabolites [5]. The phytochemical screening of leaves

of *Caricapapaya*, stem bark of *Mangifera indica*, leaves of *Psidium guajava* and the leaves of *vernonia amygdalin* showed the presence of bioflavonoids and reducing sugars. *Mangifera indica* did not contain cardiac glycosides and alkaloids while *Psidium guajava* also showed the absence of alkaloids and anthroquinones, it was similarly absent from *Vernonia amygdalina* [6].

*Psidium guajava*, *Piper guineense*, *oranthus spectabilis*, *Talinum triangulare*, *Senna occidentalis*, *Rauvolfia vomitoria*, *Allium sativum*, *Allium cepa*, *Carica papaya*, *Euphorbia hirta*, *Ocimum gratissimum*, *Persea americana*, *Piper guineense* and *vernonia amygdalina* were analysed for their phytochemicals. The plant parts have revealed the presence of various components of medicinal importance including tannins, flavanoids, cardiac glycosides, while alkaloids were present in all except *Allium sativum*, *A. cepa*, *O. gratissimum* and *p. americana*. saponins were present in all except the seeds of *Senna occidentalis*, while tannins were present in all except bulbs of garlic [7].

Phytochemical analysis in aerial parts of *Lantana camara* showed the presence of alkaloids, anthroquinones and glycosides were absent but tannins and triterpenes were found. The preliminary phytochemical screening of the *Solanum trilobatum* Linn. Leaves revealed the presence of sugar, protein, alkaloids, flavonoids, saponins, tannins, cardiac glycoside, terpenoids and lipids [8]. The phytochemical tests of the crude methanolic stem bark extracts of *Ficus thonningii* revealed the presence of alkaloids, carbohydrates, flavonoids, saponins and tannins [9]. The preliminary phytochemical analysis of eight ethnomedicinal plants like *Ocimum*

sanctum, *Hyptissuaveolens*, *Croton physalis minima*, *Tephrosiavillosa*, *Malachracapitata*, *Cleome viscosa* and *Galphimia glauca* like alkaloids, flavonoids, tannin, phlobatanin, terpenoid, saponin, steroid, and cardiac glycoside in their aqueous leaf extracts [10].

The phytochemical analysis conducted in *Helictrysum longifolium* extract revealed the presence of tannins, flavanoids, steroids, and saponins. The phytochemical screening of leaves of *Centella asiatica* revealed the presence of alkaloids, terpenoids, saponins, anthroquinones and phenols. The leaves of *Centella asiatica* showed the absence of steroids, glycosides and tannins [11]. Phytochemical analysis of the chemistry and various health beneficial functional properties of the *Centella asiatica* plant revealed its potential antioxidant, antimicrobial, cytotoxic, neuro protective and other activities have been widely claimed in many reports and its properties mechanism of action of the plants bioactive constituents namely the triterpenic acid, triterpenic, saponin, flavonoids, and other phenolic compounds [12]. Phytochemistry, traditional and pharmacological applications of *Centella asiatica*. It accumulates large amount of pentacyclitriterpenoids saponin which forms the major store house of secondary metabolites providing active compounds stimulates cell rejuvenation, improves physical and mental health [13].

Several plants and herb species used traditionally have potential antimicrobial and antiviral properties and this has raised the optimism of scientists about the further of phyto-antimicrobial agents. Jayashree (2014) [14] proposed that the methanolic extract had higher antibacterial and antifungal activity than that of aqueous extract which may be due to solubility of the different constituents in different solvents having antimicrobial. Also concluded that methanol was the most effective solvent for the extraction of antibacterial compounds from selected seaweeds. Gaertn belonging to the family *Euphorbiaceae* possess antiviral antibacterial, anticancer, anti-allergy and anti-mutagenic properties, commonly known as amla. It is highly valued in traditional medicine [15]. Five different organic solvents and aqueous extracts of *Gymnemamontanum* leaves were screened for their phytochemical composition, antimicrobial and radical scavenging activities. The most susceptible microorganisms were found to be *Salmonella typhi*, *Pseudomonas aeruginosa* and *Candida albicans* [16].

The results of the antimicrobial assay of the methanolic extract of *Mimosa pudica* indicates that the plant exhibited antimicrobial activity against *Aspergillus fumigatus*, *Citrobacter divergens*, *Klebsiella pneumonia* at three different concentrations of 50, 100 and 200 µg/disc [17].

The crude methanol stem bark extracts of *Ficusthonnigili* inhibited the growth of the test organisms like *Escherichia coli*, *Klebsiella* spp, *Pseudomonas aeruginosa*, *Salmonella typhi*, (Gram negative) *Staphylococcus aureus* and *Streptococcus* species at different concentrations especially against *Pseudomonas aeruginosa* and *Streptococcus* species [18]. Phytochemical and antimicrobial screening of the stem aqueous extract of *Anisopusmannii*, showed the presence of saponins, flavonoids, alkaloids, glycosides, terpenoids, and steroids. The stem aqueous extract of *Anisopusmannii* independently inhibited the growth of *Escherichia coli*, *Staphylococcus aureus*, *Streptococcus pyogenes*, *Salmonella gallinarum*, *Klebsiella pneumonia* and *Pseudomonas aeruginosa* except for *Candida albicans* where the extract did not show any activity [19].

Phytochemical studies of *Cardiospermum halicacabum* Linn. indicated that the leaf and stem contain a broad spectrum of secondary metabolites. Phenol, tannin and saponins were predominantly found in all the five tested solvent extracts of leaf followed by steroids, sugars, flavonoids and terpenoids. Likewise phenol, tannin, amino acids were predominantly found in any of the solvent extraction of stem. All the extracts showed varying degree of inhibitory potential against all the tested bacteria. Acetone and chloroform extracts of leaf had higher inhibitory action against *Salmonella typhi* and *Streptococcus subtilis* respectively. Acetone extracts of stem showed maximum inhibitory action against *Salmonella typhi* and benzene extract of stem had moderate inhibitory action against *Escherichia coli* [20]. In Ayurvedic system of medicine it is commonly used to treat Sious disease such as cardiogenic, nervetonic, sedative to nerves, insomnia and epilepsy. The primary active constituent of *Centella asiatica* is saponins also called as triterpenoids including siaticoside. This constituent is mainly responsible for this activity. Several research workers have investigated that the plant possess cognition and antioxidant properties, gastric ulcer healing activity, cytotoxic and antitumor activity, memory enhancing and cardioprotective activity [21].

Phenols, flavonoids and tannins are good antioxidant which has been reported to have anti-diarrhoeal activity substance and prevent or control oxidative stress disorders [22]. Flavonoids are potent water soluble antioxidants and free radical scavengers which prevent oxidative cell damage and have strong anticancer activity specific physical, chemical and biological activities that as are potent water soluble anti-oxidants as drugs, biological activities that possess make them. The curative properties of medicinal plants are due to the various secondary metabolites such as alkaloids, the presence of glycosides, phenols, saponins, steroids etc.

## CONCLUSION

In present situation, growing MD problem leads to global medicine in today's situation; growing MD problem is a global medical threat and continues to challenge the scientific community. Understanding the key molecular mechanisms in the testing of bioactive small molecular compounds has become a major challenge for drug discovery researchers. Synthetic drugs reduce the effectiveness of drugs and increase the problem of toxicity. This has led researchers to resort to herbal remedies for treatment as they play an important role in the development of effective treatment methods. The phytomedicine success story is a prime example of ethnobotanists inspiring research into more herbal medicines to fight MD.

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