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Anti-microbial and antiviral activity of medicinal plants: A review

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Abstract

Plants have medicinal, pharmaceuticals and cosmetic potential, and using it for novel products may be useful for humans. Herbs are significant part of healthcare throughout the world. Herbal medicines have been extensively utilized as efficient remedies for the prevention and management of multiple health conditions. In present study, antimicrobial, antidiabetic and antiviral effect of herbal plant *Pongamia Pinnata*, *Ocimum sanctum*, *Azadirachta indica* etc. was reviewed. The results from the present research work help the internalization and exercise of herbal plants in the formulations to give a better effect. The herbal hand wash has been evaluated by various parameters such as color, pH, viscosity, foam height, foam retention and skin irritation test. The obtained result is in the acceptable limits with less or no side effects. The further development should be performed to achieve broad spectrum antidiabetic, cardiovascular, cancer, HIV related medicinal activity with different extracts.

Keywords: Herbal medicines, *Pongamia Pinnata*, *Ocimum sanctum*, *Azadirachta indica*, microbial infection, antiviral infections

Introduction

One of the valuable and significant species in the flowering plant Fabaceae family is the *Pongamia Pinnata*. As stated by Bala states that the only species in the genus *Pongamia* is *Pongamia pinnata*. It is noteworthy from a botanical perspective that the genus's nomenclature is particularly perplexing due to the synonymy of numerous species belonging to other genera. Another well-known name for this plant is *Millettia pinnata* (L. Panigrahi, Vent for *Pongamia glabra*. as well as *Derris indica*. *Pongamia pinnata* is known by a number of common names in different countries, including kacangkayulaut in Malay, ki pahanglout in Indonesia, karanja in Hindi, Bengali, and Sanskrit, and pongam oil tree/malvanut in English^[1].

Pongamia pinnata (L.) Pierre (Synonyms *Derris indica* Lam., Bennet, *Pongamia glabra* Vent, & *Cytisus pinnaus* (L.)) tree belonging to the family Fabaceae, sub-family, apilionaceae, popularly known, as 'Karanj' or 'Karanja' in Hindi as well as in Odia. This tree is famous for its multipurpose and medicinal purpose and as a potential source of biodiesel. It can be propagated either by seeds or by stem cuttings. The seeds contain about 28 - 34% oil with a high percentage of polyunsaturated fatty acids. *Pongamia* tree has the advantage of growing under ecological agro-climatic condition and is native to India, found to grow all most all states of the country starting from sub Himalayan region to costal saline area. Besides the oil yielding Capacity, its multipurpose benefits as a provider of green manure and medicine, and its role in agro-forestry make it a potential candidate for largescale plantation on marginal lands.

Antimicrobial Activity of Plant Extracts

Antimicrobial products can be obtained from *Pongamia Pinnata* plant or herbal extracts. In developing nations, these *Pongamia Pinnata* plant and their natural products are used to treat common illnesses. Because of the presence of phytochemical substances like tannin and phenolic compounds, among others, they exhibit antimicrobial activity. They have antimicrobial, antifungal, anthelmintic, antioxidant and antiulcer activities against different types of microbes. *Azadirachta indica* has antimicrobial activity against bacteria and fungi are *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa*, *Aspergillus*

niger and *Penicillium sp.* from methanolic extract. *Acacia nilotica* has antifungal activity against *Penicillium italicum* and *Aspergillus niger* from Methanol, Diethyl ether; Acetone and Aqueous extract. *Bougainvillea spectabilis* leaves extract has Antiulcer activity against different types of ulcer like ethanol induced ulcer, water plunging stress induced ulcer in rats. The multidrug resistance have been developed due to the more use of commercial antimicrobial drug in treatment of infectious disease. Many types of drugs gained from *Pongamia Pinnata* plant, like morphine from *Papaver somniferum*, *Ashwagandha* from *Withania somnifera* and Ephedrine from *Ephedra vulgaris* etc. The medicine *Pongamia Pinnata* plant are rich in phytochemical, which are good source of drugs and essential oil for the treatment of disease. There are many advantage for clinically uses of medicinal *Pongamia Pinnata* plant because they are safe, effective and easy available. Many pathogenic diseases are cured by medicinal *Pongamia Pinnata* plant from ancient time. Medicinal *Pongamia Pinnata* plants have been a good source for new antimicrobial drug. Medicinal *Pongamia Pinnata* plant are effective to the health of peoples.

Certain chemicals that cause physiological effects on the human body are secondary metabolites of medicinal *Pongamia Pinnata* plant. Medicinal *Pongamia Pinnata* plant contains a variety of compounds with antioxidant and antimicrobial qualities which defend the human body against various pathogens, including bacteria and fungi. New medications and pharmacological studies on medicinal *Pongamia Pinnata* plant are crucial. Both allopathic and conventional medicine has employed plant phytochemicals. The medicinal *Pongamia Pinnata* plant and its product's target site in relation to antibiotics that are effective against drug-resistant pathogens. Many nations are using more plant compounds for medicinal purposes. These *Pongamia Pinnata* plant and its products control pathogen growth in specific and different situation. These *Pongamia Pinnata* plant have been used as flavor and food for eat.

Medicinal *Pongamia Pinnata* plant are good source of different types of molecules which show antioxidant and antimicrobial properties. Which protect human body from different types of pathogen like bacteria and fungi. Medicinal *Pongamia Pinnata* plant are good source to get different types of drugs. The substances of medicinal *Pongamia Pinnata* plant have been used in to allopathic and traditional medicine. Medicinal *Pongamia Pinnata* plant and its product control pathogen growth in specific and different situation. These *Pongamia Pinnata* plant produce a number of phytochemical substances which resist, relief and cure disease. Medicinal plant extract and its phytoconstituent which are responsible for antimicrobial property has great importance in clinical treatment. The main role of these medicinal *Pongamia Pinnata* plant is that these *Pongamia Pinnata* plant have not any side effect till date.

Medicinal *Pongamia Pinnata* plant are source of different types of molecules. It has antimicrobial and Antioxidant properties. It protects human body from different types of microorganisms and cellular oxidation. Different types of medicinal *Pongamia Pinnata* plant have antioxidant and antimicrobial activity. Medicinal *Pongamia Pinnata* plant produce a large number of compounds used for cure of different types of disease caused by microorganisms. The Tested medicinal *Pongamia Pinnata* plant are *Calotropis procera*, *Zizyphus sativa* leaves extract have antibacterial

activity against *Bacillus subtilis*, *Bacillus cereus*, *Escherchia coli*, *Pseudomonas aeruginosa* and *Salmonella typhi*.

3 Antiviral activity of medicinal plant

The extract of medicinal plant and their product have been used as folk medicines for treatment of different kinds of disease including viral disease. There is increasing resistance to antiviral drugs. So, there is need of new antimicrobial drug for treatment of viral disease. Recently, antiviral activities have been shown by medicinal *Pongamia Pinnata* plant and their products. Extract of Polyherbal *Pongamia Pinnata* plant having anti-infective activity, have been screened for their antiviral activity. In last decades many antiviral compounds have been used as clinically for cure of disease.

Pongamia pinnata & *Ocimum sanctum* grow in wide range of habitat. It grows up to 1800m in Himalayas and as far as Andaman and Nicobar Island. It is found in all over India except some area of India. It is straight, non woody, branched and softy hairs. It grows in two or three years. The height of this plant is 30-75 cm long. The leaves are elliptic oblong, acute, entire and pubescent on both sides. Flower of *Ocimum sanctum* are purplish color, whorled are close, less compressed, smooth and pale brown in color with black marking. The extracts of *Ocimum sanctum* containing phytoconstituent used for preservation of food products and making of drugs against food born pathogenic microbes. It is used in the traditional medicine in the treatment of headaches, cough, diarrhoea, ulcers and kidney malfunctions. It is used as insecticide and fungicide. It have antibacterial, antiviral, antioxidant antifungal, antiprotozoan, antimalaria, antidiarrhoeal, antidiabetic and anticancer properties. *Azadirachta indica* is native of Burma and India. It grow in Tropical and subtropical countries. It is 15-20m long and evergreen but under drought it fall all leaves. The family of *Azadirachta indica* is Meliaceae and the common name is "Neem". It has antiviral property against vaccinia and chikungunya. *Azadirachta indica* has antimicrobial property due to the presence of various types of bioactive compounds in different parts of this plant. Its leaves are green color. It is large spread up to 10m in diameter, branches are spreading, bark are thick, outside dark grey and inside reddish in color.

Anti-diabetic Activity of Medicinal plants

The antidiabetic action of *Pongamia pinnata* (Family: Leguminosae) leaf extricates was explored in alloxan-induced diabetic pale skinned person rats. A comparison was made between the activity of diverse extricates of *P. pinnata* and a known antidiabetic sedate glibenclamide (600 µg/kg b. wt.). An verbal glucose resistance test (OGTT) was moreover performed in exploratory diabetic rats. The petroleum ether, chloroform, liquor and fluid extricates of *P. pinnata* were gotten by basic maceration strategy and were subjected to standardization utilizing pharmacognostical and phytochemical screening strategies. Measurements choice was made on the premise of intense verbal poisonous quality ponder (50-5000 mg/kg b. w.) as per OECD rules. *P. pinnata* ethanolic extricate (PPEE) and fluid extricate (PPAE) appeared critical ($p < 0.001$) antidiabetic action. Diabetes mellitus, a common heterogeneous metabolic disorder, is predominant all through the world and has been anticipated to gotten to be one of the world's primary

disablers and executioners inside the another 25 a long time. Blood glucose level, pee sugar and body weight have been commonly measured to screen the glycemic control instrument. Within the show ponder, diabetic rats had lower body weight, tall blood and pee sugar levels as compared to typical rats. Be that as it may, orally managed PPAE and PPEE essentially expanded the body weight and diminished

the blood glucose level. This might be due to potentiation of the affront impact of plasma by expanding the pancreatic discharge of affront from existing β -cells of islets of Langerhans or its discharge from bound affront. The critical and reliable antidiabetic impact of PPAE and PPEE in alloxan diabetic rats may moreover be due to upgraded glucose utilization by fringe tissues.

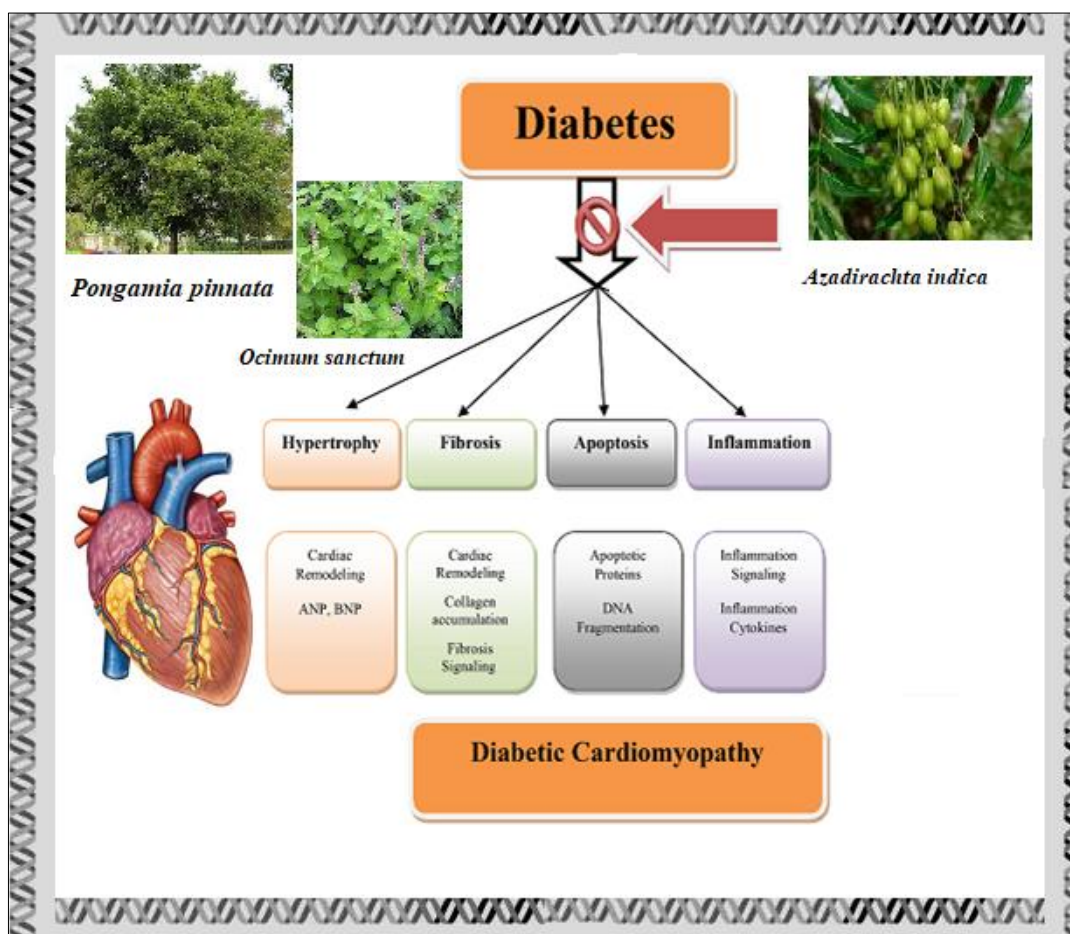


Fig 1: Cardioprotective mechanism of medicinal plant in diabetes

Many pharmacological and medicinal uses of different parts of *Pongamia pinnata* oil, bark and leaf extract used as folk medicine for treatment of diabetes. It is used for cure of chronic syphilitic sores and indolent ulcer. Many phytochemical compounds have been isolate and characterized from *Azadirachta indica*. Many compounds are chemically similar and biogenetically derivable from tetracyclic-terpenes. These compounds have been many biological properties for example, pesticides, antifeedants and cytotoxic properties. *Azadirachta indica* is used for control the microbes present in air and its leaves have good antibacterial activity. This plant is easy available and safe for use because it has biodegradability and less toxic for non-target organisms. *Azadirachta indica* has different types of phytochemical that are complex in structure and chemically different.

Acacia nilotica: *Acacia nilotica* is found in dry area. Seeds may grow 15 years after seed drop. A large number of *Acacia nilotica* found in forest area in India. Tree are mature when gave fruit and flower after two or three years of growth. March and June is flowering season of *Acacia nilotica* and between July and December is pod forming season of *Acacia nilotica*. The season of leaf fall occur from

June to November. Seed pods drop occur between October to January. *Acacia nilotica* is 15- 18 m and 2-3 m in diameter. The colour of bark is grey green in young tree and light black after maturation of tree. The leaves are bipinnate, pinnate 3-10 pairs, 1.3- 3.8cm long, flower of *Acacia nilotica* are bright golden yellow colour and present at the end of branches. Pods are green in colour and after maturation greenish black colour.

Acacia nilotica are used for making medicines for different types of disease like tumours and indurations of liver and spleen. It can use for colds, cough, diarrhea, dysentery, fever, leucorrhoea and smallpox. *Acacia nilotica* is medically used in the cure of various types of disease like fever, leucorrhea, dysentery, cold and stimulation of nerves. Anti-inflammatory property present in the pods and leaves of *Acacia nilotica*. Its leaves are rich in proteins. *Acacia nilotica* is rich in nutrients with varying properties. *Acacia nilotica* is not showed anti-inflammatory property and it is examined when rats are treated with extract of this plant. *Acacia nilotica* is a good source of natural antioxidants. The antimicrobial activity of *Acacia nilotica* is related to its phytochemical substances which are responsible for medicinal properties.

Conclusion

The toxicity and herb medicines interaction that originate from the practice have related to violent side effect. The surveys of world health organization represent that more than half people of the world use herbal drugs for treatment of disease. In last decade, increasing popularity of the herbal products. Over the counter food may be disturbed with more pesticides, chemical toxins and microbial contaminants. Excessive pesticides, chemical toxins and chemical toxins and bacterial contaminants may be lead to the source of herbal products, if they are grown when collecting plant material. People believe that natural and herbal products are safer than synthetic products and they have no side effect on peoples. The sources of different types of phytochemicals are secondary metabolites of Pongamia Pinnata plant that can use directly as raw material for the preparation of medicines. When herbal medicines are compared to synthetic medicines than herbal medicines are more acceptable to human body.

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