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RESEARCH ARTICLE

COMPARISON OF NINE INDIAN MEDICINAL PLANT EXTRACTS FOR THEIR ANTIBACTERIAL ANTIFUNGAL AND ANTIOXIDANT ACTIVITIES

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ABSTRACT

India has a vast variety of medicinal plants. Medicinal plants synthesize variety of phytochemicals that help to defend against wide variety of microorganisms including bacteria, fungi, helminthes, and viruses. Use of plants as a source of medicine has been an ancient practice and is important component of health system in India. General public, academic and government interest in traditional medicine is growing rapidly due to increase side effects of the adverse drug reactions and cost factor of modern system of medicine. The present study focuses on comparison of nine Indian medicinal plants extracts for their Antibacterial, Anti-fungal, and Antioxidant activities.

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INTRODUCTION

Herbal drugs are used for primary health care, not only just in rural areas in developing country, but also in developed countries as well, where modern medicine are predominantly used. Herbal medicines are used by 60% of the world's population, while the traditional medicines are derived from medicinal plants, minerals and organic matter. The herbal drugs are prepared from medicinal plants only. In western countries also, the use of herbal medicine is growing rapidly with approximately 40% of population reporting use of herbs to treat diseases within past years. General public, academic and government interest in traditional medicine is growing rapidly due to increase side effects of the adverse drug reactions and cost factor of modern system of medicine. Plants have evolved the ability to synthesize chemical compounds that help them defend against attack from a wide variety of microorganisms, insects and animals. Some of these compounds whilst toxic to plant predators, turn out to have beneficial effects when used to treat human diseases. The present study includes 9 Indian medicinal plants namely- *Murraya koenigii* (curry tree), *Catharanthus roseus* (Sadabhar plant), *Calotropis procera* (Madar), *Moringa oleifera* (drumstick plant), *Nyctanthes arbor tristis* (night flowering jasmine),

Argemone maxicana (maxican poppy). For their comparative analysis of Antibacterial, Antifungal, and Antioxidant effects these plants have wide variety of phytochemicals that have potent antibacterial, antifungal, and antioxidant effects. A brief account of these plants is as follows:-

1. *Murraya Koenigii*-: It is tropical to sub-tropical tree in the family Rutaceae, it also has antioxidant, antimicrobial, hepatoprotective, hypocholesterolemic. It is also used in conditions like diabetes, boils, digestive system. Its daily use prevents premature graying of hairs. It's leaves and other parts shows the presence of Alkaloids, Glycosides, which are reported to possess antioxidant, antibacterial, antifungal, larvicidal, anticarcinogenic, hypoglycemic, hypolipidemic and anti-hypertensive activity.

2. *Catharanthus roseus*-: *Vinca rosea* contains 2 classes of active compounds, the alkaloids and tannins. More than 100 alkaloids have been found in this plant in which "vincristine" and "vinblastine" are more notable. *Catharanthus roseus* has a variety of medicinal properties such as antibacterial, antifungal and antiviral. It contains 70 different types of alkaloids (Indole alkaloids) and chemotherapeutic agents that are effective in treating various types of cancers.

3. *Calotropis procera*-: *Calotropis* is a genus of flowering plants belonging to family Apocynaceae. This plant is called Madar or Medar. The plant is known as "aak" in ayurveda and

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was used in cutaneous diseases, intestinal worms, cough, ascites, asthma, bronchitis, dyspepsia, swellings, paralysis, intermittent fevers, anorexia, inflammation and tumors. In large dose it is known to act as a purgative and an emetic. The milky exudation from the plant is corrosive poison. The latex is said to have mercury like effect on human body, and is often referred to as vegetable mercury which is used in place of mercury in aphrodisiacs. Some phytochemical studies, alkaloids, tannins, terpenoids, anthraquinones, saponins, glycosides, phlobatanines.

4. Moringa oleifera:- Moringa is used for anaemia, arthritis, joint pain, asthma, cancer, constipation, diarrhea, epilepsy, stomach pain, and intestinal ulcers, high blood pressure, kidney stones, fluid retention and thyroid disorders, bacterial, viral, fungal, and parasitic infections. It has aphrodisiac effect. Ethanolic extract of leaves of moringa shows the presence of flavonoids, tannins, glycosides, and terpenoids, which have potent antibacterial, antifungal and antioxidant activity.

5. Nyctanthes arbor-tristis:- Its leaves are antibacterial, anthelmintic, anti-inflammatory, hepatoprotective, immunopotential, antipyretic, antioxidant, antifungal and antioxidant. Flowers are diuretic, anti-bilious, antioxidant, anti-inflammatory, sedative and anti-filarial. Seeds are antibacterial, immunomodulatory, and anti-leishmanial. Bark is antimicrobial and stem is antipyretic and oxidant. Phytochemical screening of leaves extract of *N. arbor tristis* shows the presence of alkaloids, glycosides, saponins, tannins, flavonoids, steroids, which shows significant antimicrobial activity.

6. Argemone maxicana:- Argemone maxicana (maxican poppy, maxican prickly poppy) is a species of poppy belonging to family "Papaveraceae". Maxican oil called argemone oil or katkar oil contains toxic alkaloids "sanguinarine" and "dihydroanguinarine". Four quaternary isoquinoline alkaloids-dehydrocorydalmine, jatrorrhizine, columbamine, and oxyberberine have been isolated from the whole plant of Argemone maxicana. As a popular medicinal herb in India, where it is known as "Satyanashi" it is used for cough, asthma, phlegm, in throat dysentery, and rheumatism. The seeds are expectorant, sedative, and seed oil is purgative. Researches shows that Mexican poppy may be useful in treating cancer and certain alkaloids inhibit viruses, bacteria and fungi. This plant is known to aggravate glaucoma and people died from eating food contaminated with oil from this plant.

7. Jatropha curcas:- Jatropha is a genus of flowering plant in the family Euphorbiaceae. In 2007 Goldman Sachs cited Jatropha curcas as one of the best candidates for future biodiesel production. It is resistant to drought and pests and produces seeds containing 27 to 40% oil. Labinosa and colleagues (2009) demonstrated potential broad spectrum antimicrobial activity of Jatropha curcas. Extracts of this plant also shows significant Anti-cancer, and Anti-oxidant activity.

8. Azadirachta indica:- It is a tree belonging to the family Meliaceae commonly known as Neem. Neem products are believed to be anthelmintic, antifungal, antidiabetic, antibacterial, antiviral, contraceptive and sedative. Neem oil is also used for healthy hairs, to improve liver function, detoxify the blood, and balance the blood sugar level. Neem leaves have

also been used to treat skin diseases like Eczema, and Psoriasis.

9. Parthenium hysterophorus:- Parthenium hysterophorus is a species of flowering plant in the Aster family "Asteraceae" that is native to America tropics. It is locally known as "congress grass" or "gajar gans". Parthenium hysterophorus is a common weed, whose decoction has been used in traditional medicine to treat fever, diarrhea, neurologic disorders, urinary infection, and dysentery malaria and as emmenagogue.

Free radicals, oxidative stress and Antioxidants:- Oxidative stress may be defined as a shift in balance in cellular oxidation-reduction reaction in favor of oxidation, which leads to damage to the cells and formation of molecular products that are indicators of oxidative stress. The free radicals and reactive oxygen species are neutralized by antioxidant system and protect biological tissues from damage due to free radicals and can be recycled or regenerated by biological reducers. The antioxidant system includes numerous enzymes and non-enzymes types of antioxidant groups that are located in the cells and extracellular fluid. The antioxidant enzymes are Superoxidase dismutase, Catalase, and Glutathione peroxidase. The non enzymatic are Vitamin C and E. oxidative stress is potentially harmful to cells, and reactive oxygen species have been known to play an important role in initiation and promotion to multi-step carcinogenesis.

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