

**STUDIES ON PHYTOCHEMICAL, ANTIMICROBIAL ACTIVITIES AND
PHARMACOGNOSY OF *CISSUS QUADRANGULARIS* LINN. AND
HYPERICUM MYSORENSE HEYNE**

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Synopsis

I. INTRODUCTION

For centuries people have used plants for healing. Plant products, as parts of foods or botanical portions and powders, have been used with varying success to cure and prevent diseases throughout history. Written records about medicinal plants date back at least 5,000 years to the Sumerians (Swerdlow, 2000) and archeological records suggest even earlier use of medicinal plants.

The twentieth century became the triumph for the synthetic chemistry - dominated pharmaceutical industry which replaced natural extracts with synthetic molecules that often had no connection to natural products. Rediscovery of the connection between plants and health is responsible for launching a new generation of botanical therapeutics that include plant - derived pharmaceuticals, multi component botanical drugs, dietary supplements, functional foods and plant produced recombinant proteins. Many of these products will soon complement conventional pharmaceuticals in the treatment, prevention and diagnosis, while at the same time adding value to agriculture (Ilya Raskin *et al.*, 2002).

At the dawn of the twenty first century, 11% of the 252 drugs considered as basic and essential by the World Health Organisation (WHO) were exclusively of flowering plant origin (Rates, 2001). The plant-derived drugs, such as taxol, vinblastine, vincristine and camptothecin have dramatically improved the effectiveness of chemotherapy against some of the deadliest cancers.

Many experts believe that the majority of plant derived natural products possibly valued at billions of dollars remain undiscovered or unexplored for their pharmacological activity (Gentry, 1993).

The US Federal Food and Drug Administration (FDA) recently published guidance for standardized multifunctional and multicomponent plant extracts referred to as botanical Drugs. Botanical drugs are fully accepted and widely prescribed in China, Japan, India and other Asian and African countries. European countries, such as Germany, allow physicians to prescribe botanical drugs.

The multifactorial nature of many complex diseases such as diabetes, heart disease, cancer and psychiatric disorders cannot be ascribed to a single genetic or environmental change but arise from a combination of genetic, environmental or behavioral factors (Kibertis and Roberts, 2002). Treatments of complementary or alternative medicine (CAM) are recommended for chronic pain affecting spine, joints or muscles, eczema and other skin complaints, asthma, cancer and migraine etc (Lewith *et al.*, 1996).

Natural compounds can be lead compounds, allowing the design and rational planning of new drugs. Compounds such as muscarine, physostigmine, cannabinoids, yohimbine, forskolin, colchicine and phorbol esters, all obtained from plants are important tools used in pharmacological, physiological and biochemical studies (Williamson *et.al.*, 1996). In the modern social context and economic view of health services, recognition of research on medicinal plants used in folk medicine represents a suitable /

approach for the development of new drugs. The potential use of higher plants as a source of new drugs is still poorly explored. Of the estimated 2,50,000 - 5,00,000 plant species only a small percentage have been investigated phytochemically and even a smaller percentage have been properly studied in terms of their pharmacological properties, in most cases, only pharmacological screening or preliminary studies have been carried out. It is estimated that 5,000 species have been studied for medical use (Payne *et al.*, 1991).

Plants are definitely poised for a comeback as sources of new drugs and human health products. This is based on the following facts

1. Ability of plants to synthesise mixtures of structurally diverse bioactive compounds with multiple and mutually potentiating therapeutic effects.
2. Secondary metabolite biomanufacturing capacity of plants.
3. Phytochemicals provide a safer and more holistic approach to disease treatment and prevention.
4. Medicinal plants are not only important sources of novel or complex molecules, but also valuable for identification of novel, therapeutically relevant pharmacological mechanisms.

Medicinal plants are used basically in two different forms: (1) as complex mixtures containing a broad range of constituents (infusions, essential oils, tinctures, extracts); (ii) as pure, chemically defined active principles. These phytopharmaceutical preparations are very popular in countries with a strong tradition of herbal medicines and legal dispositions

facilitating the registration of such preparations, such as Germany, France and Switzerland. In western medical herbalism, traditional Chinese medicine and ayurveda, combinations of herbs are fundamental to their philosophy. This attitude to their formulation and use differentiates herbal products from conventional medicine. Traditional Chinese and Ayurvedic medicinal systems, emphasizes the mutually potentiating effect of different components of complex medicinal mixtures.

Therefore, considering the importance of botanical drugs from flowering plants, 2 plants were chosen for the study namely *Cissus quadrangularis* Linn. belonging to the family Vitaceae and *Hypericum mysorensense* Heyne to the family Hypericaceae. The aim of the present study was to find out the effect of mixtures of plants in the control of human pathogens.

Genus *Cissus* L. is the largest genus in the family Vitaceae. It has 350 species distributed in the tropics. In India, 75 species are found, which have definite economic utilities. *Cissus quadrangularis* Linn. is one such common species which has been used by tribal and rural inhabitants of India for medicinal and edible purposes.

Cissus quadrangularis Linn. belongs to the family Vitaceae and is related to the cultivated grapes, medicinally useful in the indigenous systems of medicine like ayurveda and siddha. The first record of its medicinal utility can be traced back in Bhavaprakasha by Bhavamishra where the medicinal properties of this species are described under the name 'vajravalli' (Vaidya Bapalal, 1982). The plant is also called 'asthisamdhani'

because of its ability to rejoin broken bones. The entire plant is used medicinally as carminative, anthelmintic, aphrodisiac, overcomes morbidity of kapha and vata, also useful in dyspepsia, piles, worms and asthma.

Genus *Hypericum* is a member of family Clusiaceae (alternate name: Guttiferae) in the order of Theales but some taxonomists classify the genus *Hypericum* as a segregated separate family, the Hypericaceae. *Hypericum perforatum* L. (St. John's wort), a perennial flowering plant native to Europe, has nearly a 200 year history of use in traditional folk medicine for the treatment of various ailments (Deltito and Beyer, 1998., Dias *et al.*, 1998). Currently, St. John's wort is widely used as an herbal remedy for the treatment of mild to moderate depression (De Smet and Nolen, 1996).

The genus *Hypericum* encompasses approximately 400 species, of which 10 morphologically and chemically distinct species grow in central Europe. Indian *Hypericum perforatum* is a rhizomatous perennial herb growing to a height of 3 feet, distributed in the Western Himalayas at an altitude of 3,000 - 10,500 feet.

Hypericum species were already known to ancient communities as useful medicinal plants. The most common use of *Hypericum* has been for the treatment of depression, as an anthelmintic, anti-haemorrhagic, for bedwetting in children, diuretic and various psychological and neurological disorders. Besides it has been also used as balm for wounds, burns, ulcers and bites (Gerard, 1975).

Hypericum mysorense Heyne a large shrub, conspicuous on the open grassy 'downs', distributed in the Western Ghats in the Nilgiris, Anamalais, Pulneys and Travancore hills above 5000 feet. The leaves of *Hypericum mysorense* possess wound healing properties and spermicidal effect.

Considering the therapeutic uses of these 2 plants namely *Cissus quadrangularis* and *Hypericum mysorense*, the present study was undertaken with the following objectives:

1. To isolate the bioactive compounds from the aerial parts of *Cissus quadrangularis* and *Hypericum mysorense*, to identify them and to determine their structure using various spectral analysis.
2. To test the efficacy of the crude extracts and isolated compounds as antimicrobial agents.
3. To test the efficacy of combined crude extracts of both the plants against pathogenic bacteria.
4. To analyse a few pharmacological activities of the crude extract.
5. To find out the nutritive values.
6. To carry out the pharmacognostic standardization of both the plants.