

# **INTRODUCTION**

# 1. INTRODUCTION

Nature is one of the golden precursors to show the prominent phenomena of coexistence. Natural products derived from plants, animals and minerals are the basis of treating many disease in animals and human (Firenzuoli and Gori, 2007). Plants have been used for medicinal purposes long before prehistoric period. Ancient Unani manuscripts Egyptian papyrus and Chinese writings described the use of herbs. Evidence exist that Unani Hakims, Indian Vaidis and European and Mediterranean cultures were using herbs for over 4000 years as medicine. Indigenous cultures such as Rome, Egypt, Iran, Africa and America used herbs in their healing rituals, while other developed traditional medical systems such as Unani, Ayurveda and Chinese Medicine in which herbal therapies were used systematically.

Traditional systems of medicine continue to be widely practiced on many accounts. Population rise, inadequate supply of drugs, prohibitive cost of treatments, side effects of several synthetic drugs and development of resistance to currently used drugs for infectious diseases have led to increased emphasis on the use of plant materials as a source of medicines for a wide variety of human ailments.

Among ancient civilizations, India has been known to be rich repository of medicinal plants. In India is the principal repository of large number of medicinal and aromatic plants, which are largely collected from the forest as raw materials for manufacture of drugs and perfumery products. About 8,000 herbal remedies have been codified in AYUSH systems in INDIA. Ayurveda, Unani, Siddha and Folk (tribal) medicines are the major systems of indigenous medicines. Among these systems, Ayurveda and Unani Medicine are most developed and widely practiced in India.

Recently, WHO (World Health Organization) estimated that 80 percent of people worldwide rely on herbal medicines for some aspect of their primary health care needs. According to WHO, around 21,000 plant species have the potential for being used as medicinal plants.

As per data available over three quarters of the world population relies mainly on plants and plant extracts for their health care needs. More than 30% of the entire plant species, at one time or other was used for medicinal purposes. It has been estimated, that in developed countries such as United States, plant drugs constitute as much as 25% of the total drugs, while in fast developing countries such as India and China, the contribution is as much as 80%. Thus, the economic importance of medicinal plants is much more to countries such as India than to rest of the world. These countries provide two third of the plants used in modern system of medicine and the health care system of rural population depend on indigenous systems of medicine.

Treatment with medicinal plants is considered very safe as there is no or minimal side effects. These remedies are in sync with nature, which is the biggest advantage. The golden fact is that the use of herbal treatments is independent of any age and the sex groups.

Medicinal plants are considered as rich resources of ingredients which can be used in drug development pharmacopoeial, non- pharmacopoeial or synthetic drugs. Apart from that, these plants play a critical role in the development of human cultures around the whole world. Moreover, some plants are considered as important source of nutrition and as a result of that they are recommended for their therapeutic values.

Some of these plants include ginger, green tea, walnuts, aloe, pepper and turmeric etc. Some plants and their derivatives are considered as important source for active ingredients which are used in aspirin and toothpaste etc.

Recipes for the treatment of common ailments such as diarrhoea, constipation, hypertension, low sperm count, dysentery and weak penile erection, piles, coated tongue, menstrual disorders, bronchial asthma, leucorrhoea and fevers are given by the traditional medicine practitioners very effectively.

Over the past two decades, there has been a tremendous increase in the use of herbal medicine; however, there is still a significant lack of research data in this field. Therefore since 1999, WHO has published three volumes of the WHO monographs on selected medicinal plants.

Due to the diversity of medicinal plants and herbal medicines, it is difficult for WHO to continue to develop more monographs on commonly used medicinal plants. One of the objectives of WHO monographs is to provide a model that will support countries in developing their own national or regional monographs on medicinal plants or national formularies on herbal medicines. Experts can be trained through the process of developing country-specific or regional monographs, and national capacity in this field can thus be built up.

### **1.1 Important properties of phytochemicals**

All plants are produced in secondary metabolites or bioactive compounds are called phytochemicals. The major phytochemicals are alkaloids, flavonoids, tannins, saponins, anthroquinones, steroids, phenols, glycosides, terpenoids etc. present. These

phytochemicals are functioning in major role and prevent the particular disease. Most of them phytochemicals are play an important role in antimicrobial activity against human beings.

Medicinal plants exhibit a wide variety of secondary metabolites like tannins terpenoids, alkaloids, flavonoids are to inhibit the greater antifungal and antibacterial activity against some human pathogenic fungi and bacteria (Owoyale *et al.*, 2005; Evans and Trease, 2002). Major role of tannins are control the growth of microbes and these compounds to make antiseptic soap, commonly used in bathing or cleaning of skin surfaces (Onwuliri, 2004). These compounds also responsible to heal in anti-inflammatory, antidiarrheal, antioxidant and antimicrobial properties (Sule *et al.*, 2010). Usually saponins are used in detergents, pesticides and molluscides in addition to their industrial applications such as foaming and surface active agents. They help in controlling cardiovascular diseases and in controlling cholesterol in humans (Onwuliri, 2004).

## **1.2 The Role of Medicinal Plants**

The pharmacological treatment of disease in the world and they may be use of herbs (Schulz *et al.*, 2001). Methods of folk healing throughout the world commonly used herbs as part of their tradition. It is also a function of the traditionally-held belief that the synergistic combination of several active principles in some herbal preparations is responsible for their beneficial effects (Taiz and Zeiger, 1991). Medicinal plants are important sources for pharmaceutical manufacturing and significant percentage of the pharmaceutical market.

### 1.3 *Coldenia procumbens* L.

*Coldenia* (creeping coldenia in english, seruppadaai in tamil) is a monotypic genus of flowering plants traditionally included in the borage family, Boraginaceae *sensu lato*. It was assigned to the subfamily Ehretioideae, but molecular data revealed it to be more closely related to the genus *Cordia*, so that other authors placed in Cordioideae. Subsequently it was placed in its own family, Coldeniaceae, within the order, Boraginales.

#### 1.3.1 Systematic position of *C.procumbens*

Class	:	Dicotyledon
Order	:	Boraginales
Family	:	Boraginaceae
Genus	:	<i>Coldenia</i>
Species	:	<i>procumbens</i> L.

#### 1.3.2 Description

Terrestrial, annular prostrate herb, up to 40 cm long. Taproot is white or brown. Stem of procumbent, flat, solid, hairy. Stipules are absent. Leaves are simple, lobed or divided, alternate, spiral, sessile or stalked, elliptic to ovate, hairy and/or scabrous on both sides, apex obtuse or rounded, bases asymmetrical, pinnately veined. Flowers are bisexual, single, axillary, petals 4, white. Fruit is nut-like structure.

#### 1.3.3 Phytoconstituents of *C.procumbens*

The major phytochemicals are Glycosides, Proteins, Amino acids, Flavonoids, Alkaloids, Tannins, Sugars, Phenols Saponins, Coumarin and Wedelolactone etc., are

present in the plant. These phytochemicals are more responsible for hepatoprotective, anti-inflammatory, anti-tumour, and anti-diabetic activity.

#### **1.3.4 Medicinal properties of *C.procumbens***

The fresh leaf extract are applied as rheumatic swelling or to mature abscesses area. The leaves are used for the treatment of tumours. The plant has shown good hypoglycaemic effects. They showed a reduction of blood glucose, triglycerides and cholesterol levels. The plant possesses pharmacological properties of analgesic, antimicrobial, anti-inflammatory, antidiabetic, hepatoprotective and antioxidant activity.

#### **1.3.5 Pharmacological activities**

##### **1.3.5.1 Analgesic activity**

The different solvents of benzene, chloroform, acetone and alcoholic extracts of *C. procumbens* leaves were screened for analgesic activity using Tail Clip and Hot Plate Methods. Fresh leaves of *Coldenia procumbens* ground and applied to Rheumatic Swellings, equal parts of dried powder mixed with seeds of fenugreek causes Suppurations of boils (Chopra *et al.*, 1958).

##### **1.3.5.2 Antimicrobial activity**

Beena (2005) suggested that the aqueous extract of the *C.procumbens* showed very good anti-bacterial activity against the microorganisms of *Bacillus subtilis*, *Staphylococcus aureus*, *E.coli*, *Proteus vulgaris*, *Klebsiella pneumoniae* and the effect compared with standard drug ciprofloxacin. Ramakrishnan *et al.* (2011) reported significant anti-microbial activity against bacteria and fungi (*Staphylococcus aureus* and *Streptococcus pyogenus*), Gram-negative (*Salmonella typhi* and *Escherichia coli*) bacteria and fungi (*Candida albicans*).

### **1.3.5.3 Anti-Inflammatory Activity**

*Coldenia procumbens* leaves postulated significant anti-inflammatory activity of maximum membrane stabilization was found to be at 98.09% in comparison with diclofenac sodium (standard drug) by HRBC membrane stabilization method due to presence of chemical profile such as Flavones, Tri-terpenoids, Flavonones and Phenols (Lavanya *et al.*, 2010).

### **1.3.5.4 Anti-diabetic Activity**

In the alloxan induced diabetic model the *Coldenia procumbens* exhibited significantly increase in body weight and reduction in blood glucose level when compared with diabetic control group of rats. Serum triglyceride levels significantly decreased in *C. procumbens* treated rats. Treatment with *C. procumbens* significantly reduced the serum cholesterol level in rats. The analysis of data indicated that the *C. procumbens* has good hypoglycemic effect in diabetic rats (Patel *et al.*, 2007).

### **1.3.5.5 Hepatoprotective activity**

The hepatoprotective activity was postulated in ethanolic extract of *Coldenia procumbens* Linn. Anti-tubercular drugs such as Isoniazid, Rifampicin, Pyrazinamide were used as toxicants and Galactosamine HCL also used. silymarin was used as standard drug (Beena *et al.*, 2011).

### **1.3.5.6 In vitro anti-oxidant activity**

Lavanya *et al.* (2010) conducted a study on *C. procumbens* for possible antioxidant activity by DPPH, total antioxidant, total phenolic and reducing power. The percentage inhibition by DPPH method was found to be 76.26% at a concentration of 500g/0.1ml

when compared with Quercetin (87.74%). The reducing capabilities of the leaf extract of *C. procumbens* were found to be in dose dependent manner which was compared with standard Quercetin. The total antioxidant activity was found to be 0.2mg equivalents of ascorbic acid. The total phenolic content was found to be 31.9mg Pyrocatechol equivalent /gm of extract.

Keeping the above facts in mind, the present investigation is justifiably planned with the following objectives:

- Collection of *Coldenia procumbens* from N.V. Kudikadu, Thanjavur District.
- To analyse that the proximate, phytochemical content and antimicrobial activity of *C.procumbens*
- Anatomical study of *C.procumbens* stem and leaf
- Characterization of phytochemicals from *C.procumbens* by UV, FTIR, NMR and GCMS analysis
- *In vitro* antioxidant and haemolysis activity of *C.procumbens* by various methods
- Hepatoprotective activity of *C.procumbens* extracts using albino rats by *in vivo* method.