Chapter - I
Introduction
INTRODUCTION

From ancient days, plants are being used for shelter, food and medicine. The use of plants for medicinal purposes is as old as our civilization. As we all know that nature holds many secrets. However, since ancient times man has learned some of its secrets. Among the most useful ones, were those related to how medicinal plants could heal or ameliorate diseases or sufferings. The first known written record of curative plants was of Sumerian herbal of 2200 BC. Ancient herbalists, including those of Cathay, India, Sumer, Assyria, Egypt, Greece, and Rome, testify to the use of herbs in the treatment of disease. Hippocrates, Galen, Charaka and Pedanius Dioscorides among others, employed them. One of the earliest Chinese herbalists was the Chinese Emperor, Chi'en Nung (Shennong), he wrote the book 'Pen Tsao a k a' Classic of Materia Medica. This book is listed around 365 healing remedies, most of which were from plants, including Ma Huang, or Chinese ephedra, which is still widely used and is the herb from which Western scientists have derived the drug ephedrine. Chi'en Nung is said to have invented agriculture around 3400 B.C. and discovered that many plants have medicinal value. He was known to have learned the hard way; he tested herbs on himself recorded their effects, and then died after consuming too much of one drug that turned out to be poisonous, a salutary lesson to us all.

In the 5th century BC, a Greek doctor Hippocrates listed out some 400 herbs in common medicinal use. Dioscorides, in the 1st century AD, wrote a herbal description by using 600 plants which ultimately became the base for many later research works. Herbs have been used for uncounted time for various purposes like healing the sick and infirm. Most of the people still continue to use herbs to benefit their bodies. People thought that herbs keep the body in tune with nature, as nature intended and maintain proper balance. Many scientific studies are still continued with modern research following the lead of old folklore and herbal uses to help finding new western medicine. Herbs do not produce instant cures, but rather offer a way to put the body in proper tune with nature. Hippocrates, who is often referred to as the "Father of Modern Medicine", and after whom
the ‘Hippocratic Oath’ is named, used many herbal remedies Around 400 BC, he wrote "Let your foods be your medicines, and your medicines your food”

In modern civilization, Nicholas Culpeper in 1649 wrote *A Physical Directory*, and a few years later produced *The English Physician* This respected herbal pharmacopeia was one of the first manuals that the layperson could use for health care, and it is still widely referred to and quoted today The first U S *Pharmacopeia* was published in 1820 This volume included an authoritative listing of herbal drugs, with descriptions of their properties, uses, dosages, and tests of purity It was periodically revised and became the legal standard for medical compounds in 1906 The World Health Organization (WHO) also estimate that 4 billion people (80% of the world population), still uses herbal medicine for some aspect of primary health care

Herbal medicine is a major component in all indigenous peoples’ traditional medicine and a common element in ayurvedic, unani, naturopathic, traditional oriental, and native American Indian medicine WHO notes that, of 119 plant-derived pharmaceutical medicines, about 74% are used in modern medicine in ways that correlated directly with their traditional uses Major pharmaceutical companies are currently conducting extensive research on plant materials gathered from the rain forests and other places for their potential medicinal value

In the present scenario herbalists employed the leaves, flowers, stems, bernes, and roots of plants to prevent, relieve, and treat the illness Many familiar medications of the twentieth century were developed from ancient healing traditions that treated diseases with specific plants Today, scientists have isolated the active constituents and analyzed from a large number of botanicals Many plant components are now synthesized in pharmaceutical industries for use in drug formulations For example, vincristine (an antitumor drug), digitalis (a heart regulator), and ephedrine (a bronchodilator used to decrease respiratory congestion) were all originally discovered through research on plants Indeed, well into the 20th century much of the pharmacopoeias contains list of drugs were derived from the herbal lore of native people Many drugs commonly used today are of herbal origin Many of the remedies employed by the herbalists provided effective treatments Studies of
foxglove for the treatment of dropsy (congestive heart failure) set the standard for pharmaceutical chemistry. In the 19th century, scientists began purifying the active extracts from medicinal plants (e.g., the isolation of morphine from the opium poppy). Advances in the field of pharmacology led to the formulation of the first purely synthetic drugs based on natural products in the middle of the 19th century. In 1839, for example, salicylic acid was identified as the active ingredient in a number of plants known for their pain-relieving qualities; salicylic acid was synthesized in 1853, eventually leading to the development of aspirin. In 1975, a substance in its bark, taxol, was found to reduce the production of cancerous tumors. Indeed, about 25% of the drug prescriptions dispensed in the developed countries contain at least one active ingredient derived from plant material. Some are made from plant extracts; others are synthesized to mimic a natural plant compound.

A comprehensive search of known plants for medicinal chemicals is an enormous task. Of the estimated 250,000 plant species on earth, only 2% have been thoroughly screened for chemicals with potential medicinal use.

There are over about 750,000 plants on earth. Relatively speaking, only a very few of the healing herbs have been studied scientifically. Plants used as medicines offer synergistic interactions between bioactive constituents both known and unknown. Plants contain minerals, vitamins, volatile oils, glycosides, alkaloids, bioflavanoids, and other substances that are important in supporting a particular herb's medicinal properties. Almost all of the current research, validating herbal medicine has been carrying in Germany, Japan, China, Taiwan, and Russia. And for the most part, the United States Food and Drug Administration (FDA), which is responsible for licensing all new drugs (or any substances for which medicinal properties are claimed) for use in the different countries.

Fortunately, the Indian sub-continent is bestowed with very rich natural resources. Specially, the Western Ghats region is one of the most prominent regions of the world in terms of its biodiversity. The availability of diverse plant wealth is certainly a greatest gift of the nature. Since from many centuries these plants are being very well exploited for their medicinal properties for various common and complex diseases by the local
traditional healers belonging to various forms of medical practices. Therefore, there is an appropriate need and good scope for the screening and evaluation of beneficial properties of various plants available.

Presently, the pharmacognistic trend is very much oriented towards the research on medicinal plants with more emphasis on the isolation and characterization of active principles and subsequently subjecting them for evaluation of pharmacological properties by selecting various parameters which includes anti tumor abilities.

In this direction of research many species of plants have been exploited and are being screened for their medicinal efficacy. Among them many members of Fabaceae have been exploited for economical, medicinal and aesthetic values. In this family the genus Erythrina includes small trees that are distributed through-out the Eastern Himalayas and in the moist deciduous forest of the Western Ghats. In the present investigation Erythrina mysorensis G., has been selected for the screening of phytochemical constituents and evaluation of various pharmacological parameters in view of its wide use in traditional medicine against various common diseases. Furthermore, this plant is available in abundance in the surroundings of Shimoga and Chickmagalur Districts which comes under the Kuvempu University jurisdiction. The plant Erythrina mysorensis G., is commonly known as Indian coral tree, Paribhadrah, Dadap and in Kannada Bili halivana.

This plant has been widely reported to have several medicinal properties in traditional form of medicine. The beneficial properties are anti-dysentry; cures Kapha and vata, stomachic, anthelmintic, improve appetite, cure urinary discharges, inflammation, febrifuge, ear ache, tooth ache, aphrodisiac and recommends for snake bite in sushruth samveda. The leaves are applied externally to disperse venereal buboes, and to relieve pain of the joints. The decoction of bark scrapings with lemon juice is employed to treat infertility. Traditionally different parts of the plants also employed as a nervine sedative, collyrium in ophthalia, anti-asthamatic, and antiepileptic, antiseptic and as an astringent. The bark is used in fever, liver aliments and rheumatism. (Telikepalli et al.)
Introduction

There are very few reports available on the phytochemical and pharmacological activities of *Erythrina mysorensis* G. and other species related to the genus *Erythrina*. Yenesew *et al.* (2009) reported that root bark contains isoflavonoid derivatives like peterocarpan, eryvarin, erycerrastagallin and shinpterocarpin. Augustin *et al.*, (2001) also isolated two new isoflavonoids from bark of *Erythrina indica* namely indicanes D and E together with eleven known compounds including: six isoflavones (gensistein, wighteone, alpinumisoflavone, dimethylalpinumisoflavone, 8-prenyl erythrinin C, and erysenegalensein E), one cinnamate (erythinassinate B), two pentacyclic triterpenes (oleanolic acid and erythrodiol), and two phytosterols (stigmasterol and its 3-o-β-D-glucopyranoside).

Jesupillai *et al.*, (2008) reported that chloroform, ethanol and ethyl acetate extracts of *Erythrina indica* leaf extracts possess analgesic activity in which alcoholic extract exhibited more prominent activity compared to other extracts. Dhar *et al.*, (1968) evaluated the different pharmacological and chemotherapeutic activities of the ethanolic extracts of the leaves and stem of three different varieties of *Erythrina* species and reported that ethanolic extracts of *E. suberosa* has antineoplastic activity. Etcheverry *et al.*, (2003) studied sedative effect of *Erythrina crista-galli* extracts for isolated fractions and stating they possess sedative effect.

Earlier to this, the selected plant has not been subjected for systematic study. The stem bark being one of the important parts of the plant, where in most of the active constituents are stored. There are no reports to show the use of stem bark of *Erythrina mysorensis* G., for the screening of phytochemical constituents and pharmacological investigations. Hence, the stem bark served as the core material for all the investigations carried out in the present study.

In view of the available facts on *Erythrina mysorensis* G., the following objectives were drawn to carry out a detailed investigation on the phytochemical, screening and pharmacological properties.

1. Sequential extraction of crude extracts of stem bark using different solvents.
2. Qualitative analysis of phytochemical groups from the extracts.
3. Evaluation of the anti-oxidant property by using crude extracts.

4. Evaluation of following pharmacological properties from the crude extracts;
   a. Anti-inflammatory activity.
   b. Wound healing activity.
   c. Anti microbial activity.
   d. Anti-tumor activity.

5. Isolation and characterization of chemical constituents from the extracts using UV, $^1$H and Mass spectral studies.

6. Evaluation of anti-inflammatory, wound healing and antitumour activity for the selected characterized chemical constituents.

Apart from the above proposed objectives additional parameters such as evaluation of anti-epileptic, anti-anxiety for crude extracts and characterized chemical constituents were also carried out. Further, anthelmintic activities for crude extracts have also been included in the present study. The overall results of the present investigations have clearly suggested the presence of antioxidant, anti-inflammatory, wound healing, anti-epileptic, anti-anxiety, antimicrobial, anthelmintic and antitumor properties of Erythrina mysorensis G. The research observations made using appropriate and standard protocols have been discussed in the subsequent sections. The ethano-medical claim of the said plant clearly corroborates with the scientific observations made in this study.