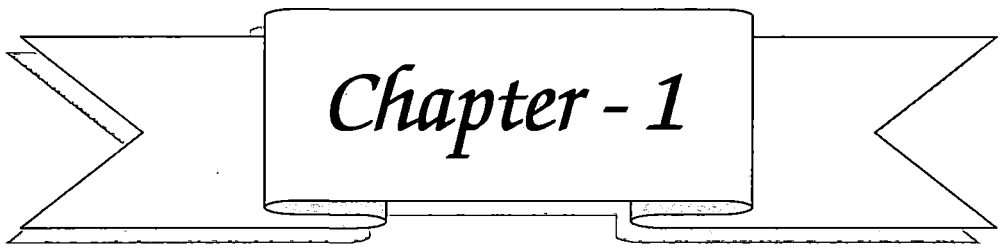

INTRODUCTION

India has one of the oldest, richest and diverse cultural traditions associated with the use of medicinal plants and herbs for human, livestock and plant health. Throughout the world, plants have been in continuous use in one way or the other for the treatment of various ailments. In India, the sacred Vedas, which date back between 3500 B.C. and 800 B.C., give many references of medicinal plants. One of the remotest works in traditional herbal medicine is "Virikshayurveda," compiled even before the beginning of Christian era and formed the basis of medicinal studies in ancient India. The Rig Veda, dating between 3500 B.C. to 1800 B.C.,seems to be the earliest record available on medicinal plants. Ayurveda, the Indian indigenous system of medicine, dating back to the Vedic ages (1500-800 B.C.), has been an integral part of Indian culture (Weiss, 1987). The earliest works of Ayurveda that we know today are the *samhitas* of Caraka and Susruta (before 600 B.C.) modified and supplemented by later authors. Herbs seem to be very important component of medicine in other cultures too; Greek, African and Chinese medicines, etc. Nearly 80% of the world population depends upon traditional system of health care. Allopathic drugs have brought a revolution throughout the world but the plant base medicines have its own unique status (Behera *et al.,* 2006).

Recently Ethno botany has emerged as an interesting and distinctive branch of botany. It is the study of the traditional knowledge acquired through trial and error methods by the primitive people especially aboriginals and tribal. The term today has come to denote the entire realm of direct relationship between plant and man (Manilal, 1989). The scope, concepts and implication of ethnobotany have been expanding at a very fast rate (Jain, 1963, 1965; Harsberger, 1985; Faulks, 1995). In India, quite a few important works on ethnobotany have been published from different corners of the country (e.g. Bodding, 1927; Rajendran *et al.*, 1997; Upadhyay *et al.*, 1997; Sen and Batra, 1997; Rai *et al.*, 1998). Humans, over the ages, have been using plants of their surrounding to cure the diseases they suffer from. It is very difficult to know when humans started using the plants against their disease. In the process of selecting the medicinal plants, they gained a lot of knowledge about medicines and medicinal plants. The traditional knowledge system handed over from generation to generation by traditional communities by oral tradition is still a living tradition in many developing countries particularly biodiversity rich third world nations.

Vast ethnobotanical knowledge exists in India from ancient time. Since the 1950s the study of ethnobotany has intensified. Jain (2007) work over four decades, both in the field and literary studies, has compiled a dictionary of Indian folk-medicine and ethnobotany that includes 2532 plants. India has about 45000 plant species; medicinal properties have been assigned to several thousand. About 2000 figure frequently in the literature; indigenous systems commonly employ 500. Despite early (4500-1500 BC) origins and a long history of usage, in the last two centuries Ayurveda has received little official support and hence less attention from good medical practitioners and researchers. Much work is now being done on the botany, pharmacognosy, chemistry, pharmacology and biotechnology of herbal drugs. The value of ethnomedicine has been realized; work is being done on psychoactive plants, household remedies and plants sold by street drug vendors. Statistical methods are being used to assess the credibility of claims.

A number of organizations within India are concerned with maintaining India's Traditional Medicine Systems. In addition, there is a wide spread development network, and established pharmaceutical industry and a wealth of botanical experts in the country. Until now, however, there has been little effort to document the volume and impact of national or international trade in India's medicinal plants. (Ganesan and Kesavan,2003). According to the latest figures, it costs around 800 million dollars to put a new drug on the market. When companies manufacture a product based on traditional knowledge and convert it into a medicine, they "acquire" a product which is worth a few hundred million dollars (Jain, 1986, 1995). USA based top pharmaceutical companies like Merck, Ranbaxy and Shaman are the classical examples. Such is the enormous potential hidden in these plants gifted by Nature (Ahmad *et al.*, 2003).

The non-disclosure/secrecy surrounding many of the herbal and medicinal formulations with curative properties practiced traditionally prevented the growth of the sector. Modernization followed by industrialization and urbanization has changed the tribal situation in such a way that they are unaware of the traditional knowledge, which had been transferred through generations. At present, this vanishing traditional knowledge survives through few elder peoples. Therefore documentation of traditional medicinal knowledge as well as medicinal plants is needed for the future. The need for conservation of medicinal herbs and traditional knowledge particularly for the developing countries like India, taking into account the socio-cultural and economic conditions, have been discussed at length by Misra (1999). Traditional medicine, which includes ethno-medicine (WHO, 1978) is

important as it provides health services to 75-80% of the world's population (Marine-Bettolo, 1980).

Very few plants used by tribal for medicine are subjected to scientific investigation. Ethnopharmacology is a newly emerging area, which has been defined as the observation, identification, description and experimental investigation of the ingredients on the efficacy of indigenous drugs. It is considered as a scientific backbone in the development of active therapeutics based on traditional medicine.

Plants are the valuable source of new natural products as these have non narcotic, having no side effect and easily available at affordable cost. The drugs of traditional system have been the starting points of the discovery of many important modern drugs. This leads to the investigation of plants and to undertake general biological screening programs of the plants not only in India but all over the world. So, random screening of plant materials in search of biodynamic compounds is necessary. The immense value of the traditional medicinal wisdom can be gauged from the fact that verification of the medicinal property of medicinal plant would involve collection, identification of the plant material, preparation of appropriate extracts and fractions of the plant for testing biological activity using animals or *in vitro* cellular models or by the latest activity guided extraction and through put analysis etc., involving taxonomists, pharmacologists, phytochemists and biochemists. The medicinal value of these plants lies in some chemical substances that produce a definite physiological action on the human body. The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids and phenolic compounds (Hill, 1952).

Plant derived natural products such as flavonoids, terpenoids, and steroids etc have received considerable attention in recent years due to their diverse pharmacological properties including antioxidants. Free radicals have been implicated as the cause of several diseases such as liver cirrhosis, cancer, diabetes and compounds that can scavenge free radicals have great potential in ameliorating these disease processes (Wilson, 1988). Antioxidants play an important role in protecting the human body against damage by reactive oxygen species (Lolliger, 1981). Antioxidants also play an important role in inhibiting and scavenging radicals, thus providing protecting to humans against infection and degenerative diseases.

A large number of phytochemicals belonging to several chemical classes have been shown to have inhibitory effects on all types of microorganisms *in vitro* (Cowan, 1999); and

some plant extracts have shown activity on both gram negative and gram positive organisms (Nascimento *et al.*, 2000). Gabriela *et al.*, (2001) did an antimicrobial evaluation of certain plants used in Mexican traditional medicine for the treatment of respiratory diseases. Characterization of antimicrobial compounds from a common fern, *Pteris biaurita* was done by Chakraborty *et al.* (2007).

Diabetes mellitus is a non communicable disease considered to be one of the five leading causes of death world wide. About 100 million people around the world have been diagnosed with diabetes and by the year 2010 it is projected that 215 million people will have the disease (Zimmet, 1999). Diabetes mellitus is a metabolic disorder and a major cause of disability and hospitalization (Foster, 1994). Diabetes mellitus is generally divided into two different types: insulin-dependent diabetes mellitus (IDDM), and non-insulin-dependent diabetes mellitus (NIDDM). Diabetes mellitus is characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both (Baquer *et al.*, 1998). Insulin therapy affords effective glycemic control in IDDM patients, yet its short comings include ineffectiveness on oral administration, short shelf life, need for preservation in refrigeration, fatal hypoglycemia in the event of excess dosage, reluctance to take injection and above all, the resistance due to prolonged administration, limits its usage. Similarly treatment of NIDDM patients with sulfonylureas and biguanides is always associated with side effects (Rang and Dale, 1991). Hence search for a drug with low cost, more active and without side effect is being pursued in several laboratories around the World.

Streptozotocin (STZ) - induced hyperglycaemia has been described as a useful experimental model to study the activity of hypoglycaemic agents (Junod *et al.*, 1969). Streptozotocin (STZ) destroys β-cells of the pancreas and induces hyperglycemia (Palmer *et al*, 1998). Oxidative stress resulting from enhanced free radical formation and/or defects antioxidants defense caused severe tissue damage and may lead to number of diseases like coronary artery disease, atherosclerosis, cancer and diabetes. Increased oxidative stress in streptozotocin diabetic rats has been reported (Garg *et al.*, 2000). In recent years many researchers have examined the effects of plants used traditionally by indigenous healers and herbalists to support liver function and treat diseases of the liver. In most cases, research has confirmed traditional experience and wisdom by discovering the mechanisms and mode of action of these plants as well as reaffirming the therapeutic effectiveness of certain plants or

plant extracts in clinical studies. Several hundred plants have been examined for use in a wide variety of liver disorders. Just a handful has been fairly well researched (Scott, 1999).

To determine the mechanism of action of hypoglycemic drugs, levels of lipid peroxides, glutathione content, the related enzymatic antioxidants superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), glutathione S-transferase (GST), glycogen content in liver and kidney tissues are important. Administration of various antioxidants such as vitamin C, vitamin E, reduced glutathione and selenium in diabetes along with hypoglycemic drugs is useful as supportive therapy (Ihara *et al.*, 2000; Head, 2000). Many indigenous Indian medicinal plants have been used to manage diabetes (Nagararajan *et al.*, 1987; Anjali and Manoj, 1995) and some of them have been tested and the active principles isolated. *Aegel marmelos* L. (Rutaceae) has been shown to be anti-hyperglycemic and to induce release of insulin (Sharma *et al.*, 1996). An isolated compound momordin from *Momordica charantia* L. (Cucurbitaceae) has been shown to posses' anti-fungal activity (Chandravadana *et al.*, 1997) and the plant extract also reduced blood sugar (Chandrasekar *et al.*, 1989). *Trigonella foenum-graecum* wild (Leguminosae) has been shown to have an anti-hyperglycemic effect in normal and alloxan-induced diabetic rats (Abdel-Barry *et al.*, 1997).

The varied climatic zone of India has large bio diversity and rich natural resources. Dakshin Dinajpur is a district of West Bengal which falls within the latitude $25^0 10' 5''$N and the longitude $89^0 0' 30''$E, surrounded by the Malda and Uttar Dinajpur districts of West Bengal from the West and by the neighboring country Bangladesh from the north, south, and east. The district has the oldest and richest cultural traditions of using medicinal plants. In this regard no research work has been done from the selected area of this district, so the present investigation was undertaken to know their traditional knowledge about the uses of medicinal plants, generally predominant in those selected areas. The proposed work was divided into two phases:

In the first phase the traditional knowledge about medicinal plants of the villagers was collected from the selected areas of the district and in the second phase detailed investigation of a few selected plants was carried out. The objectives of the present work were: (i) to collect information from the locals for the uses of medicinal plants of Dakshin Dinajpur district; (ii) to gather information on the nature of plants/ Plant parts used and complete details of such plants; (iii) to select some plants used by villagers, showing good medicinal

properties, (iv) to make detailed studies of the plants especially on morphology, biochemistry and pharmacology, (v) to isolate the active principles from such plants and partially characterize the isolated compound(s), (vi) to test the antimicrobial activities of the active principles, (vii) to test the presence of antioxidants, (viii) to determine the efficacy for suppressing hyperglycemia.

At the onset, a literature review pertaining to the line of work has been presented. Experiments have been performed based on standard methodologies. Statistics have been done wherever necessary.