INTRODUCTION

Plants have been the basis of many traditional medicines throughout the world for thousands of years and continue to provide new remedies to mankind. Plants have been one of the important sources of medicines since the beginning of human civilization. The recent resurgence of plant remedies resulted from several factors, such as effectiveness of plant medicines and lesser side effects compared with modern medicines. Indigenous herbs are used as remedies against various diseases in the traditional system of medicine or in ethno medical practices. For the past few decades, compounds from natural sources have been gaining importance because of the vast chemical diversity they offer. This has led to a phenomenal increase in the demand for herbal medicine in the last 2 decades. They are relatively safe, easily available, and affordable to the masses. These drugs have given important lead in drug research, resulting in the discovery of novel molecules.

The history of medicine dates back perhaps to the origin of human civilization. From the earliest times mankind has used plants in an attempt to cure diseases and relieve their sufferings. Primitive people in all ages have had some knowledge of medicinal plants. Most savage people believed that diseases were due to the presence of evil spirits in the body and could drive by the use of disagreeable substances found in nature. The
knowledge of medicinal plants and their various products was not only to the medicine men but number of tribes living in remote areas knew it. Nevertheless folklores, superstitious, traditions rituals, tribal practices in vague then and even to the present day bear ample proof of the great influence which the herbal charm had in the past and is still prevalent not among the poor and illiterate put also to the so called modern men of the society.

Ethnomedicine is a branch of ethnobotany, which deals with the role of plants based on their ancient knowledge of medicinal importance. Ethno botany is the study of how people of a particular culture and region make use of indigenous plants. Ethno botany means all aspects of direct relationship of plants with man, or the science of human interactions with plants and its ecosystem. It includes the study of foods, fibers, dyes, tan, taboos, and avoidance and even magic co-religious beliefs. Other useful and harmful aspects about plant, ethno botany has its roots in Botany. Botany in turn originates in part from an interest in finding plants to help for fight illness. In fact, medicine and botany have close ties. Many of today’s drugs have been derived from plant resources.

The plants have been used as medicines since the beginning of human civilizations (Hill, 1952) and have been a source of treatment of
the common day ailments. From the beginning of civilization man has tried to find remedies against different ailments or diseases in his own way. A medicinal plant is one used by people for medicinal purposes and to build or maintain health, stave off diseases or promote recovery from illness or misfortune. Medicinal herbs make an effective source for the traditional and modern medicine. Even today it is being in use by hundreds and thousands of people in the developing world and is deriving a significant part of them for their survival and also for their income generation by gathering the animal and plant products (Iqbal 1993; Walter 2001).

According to WHO (World Health Organization), 70% population of the world depend on Traditional Health Care System (THCS) for curing various diseases (WHO, 2002). It is well known that this system offers minimal side effects and relatively low cost as compared to other systems of medicine. India occupies a premier position in the use of herbal drugs utilizing nearly 2,500 plant species in different formulations. Estimated number of medicinal drug-manufacturing units in India is over 7800 which consume about 2000 tones of herbs annually (Ramakrishnappa, 2002). Over 500 million people of the country receive the benefits of THCS with nearly 460,000 practitioners of the system. It is
interesting to know that the ancient Indians were acquainted with larger number of plants than the natives of any other country of the world. This is clearly evident by the ancient Indian treatise such as ‘Materia Medica’, ‘Nighantus’ and ‘Koshas’.

Across the country, 90% diversity of medicinal plants occurs in the wide range of forest types (21 forest types) and only about 10% are restricted to non-forest habitats. Particularly, the Indian Himalayan Region (IHR) supports major part of this diversity of medicinal plants is clearly evident in the records revealing 1,748 species in the region (Samant et al., 1998). This is the reason that major part of the exported raw material originates from the Himalayan region (Rawat and Garg, 2005).

Plants have been highly esteemed source of medicine throughout human history. They are widely used today indicating that plants are growing part of modern, high-tech medicine. About 25 – 30% of today’s prescription drugs contain chemical moieties derived from plants. The Indian system of medicine i.e. Ayurveda along with classic texts of Bheshajya Ratnavali has a long-standing tradition that offers a unique insight into comprehensive approach to asthma management through proper care of the respiratory tract. Ayurvedic formulations used in the
management of asthma, therefore, judiciously combine herbs to support
the physiology of respiration. These plants and herbs apart from exerting
bronchial action also possess concomitant properties like antioxidant to
support the digestive, cardiac, nerve functions and expectorant as well as
just plain soothing herbs.

Medicinal plants, since time of immemorial, have been used in
virtually all cultures as a source of medicine. It has been estimated that
about 80 – 85% of population both in developed and developing countries
rely on traditional medicine for their primarily health care needs and it is
assumed that a major part of traditional therapy involves the use of plant
extracts or their active principles (Ignacimuthu et al., 2006; Elujoba et al.,
2005; Kochhar and M. Nagi, 2005). Due to lack of organized health care
systems in developing countries, people with chronic diseases like asthma
are among the worst suffers in their communities today. Hence, majority
populations still have limited access or no access, especially those in
remote areas, to modern medicines. Instead they use traditional medicines
for a range of disease complications. Hence, it was proposed to isolate
active principles from the medicinal herbs used by the tribal peoples for
the management of asthma.
Asthma: The allergy of lungs.

Asthma is a disease of the human respiratory system in which the airways constrict and become narrow, often in response to a trigger such as exposure to an allergen, cold air, exercise, or emotional stress (Prasad et al., 2009). Asthma affects 7% of the total population and approx 300 million worldwide (Christopher and Fanta, 2009). During attacks the smooth muscle cells in the bronchi constrict, and the airways become inflamed, swollen and breathing become difficult. The term asthma actually comes from the Greek word panos, which means to pant or to breathe with an open mouth. In Ayurveda, it is considered to originate from the affliction of the stomach and other parts of gastro-intestinal tract. In most of the cases, therefore, either in the beginning of the disease or before each attack, the patient suffers from indigestion, constipation or even diarrhea. The seat of manifestation of the disease is lungs (Dash, 2001).

Historical background of Asthma:

The modern school of thought regarding asthma as a disease is so powerful that it is difficult to imagine asthma, as it was once conceptualized. During the seventeenth century, once English physicians
Thomas Willis and Sir John Floyer began arguing that asthma was different from other breathing disorders and is the same from person to person. They mentioned that asthma, as a specific form of disordered breathing, must be treated differently from other forms of breathlessness cases. By the late nineteenth century, physicians believed that asthma was a disease which had a specific set of causes, clinical consequences and requirements for treatment, despite the diversity of individual experiences. Because of the spectrum of severity within asthma, some people with asthma only rarely experience symptoms, usually in response to triggers, whereas other more severe cases may have marked airflow obstruction at all times.

According to the WHO (January 2002) between 100 and 150 million people around the globe suffer from asthma and this number is rising. According to the UCB Institute of Allergy of Belgium, in Western Europe as a whole, asthma has doubled in last 10 years. In the United States, the number of asthmatics has increased by over 60 percent since the early 1980s and deaths have doubled to 5000 a year. There are about 3 million asthmatics in Japan of whom 7 percent have severe and 30 percent have moderate level of asthma. In Australia, one child in every six under the age of 16 is affected with asthma. Although, asthma sufferers have
increased in every age group during the last decade, the largest increase of 73 percent occurred among children and young adults under the age of 18 years. India has an estimated 15-20 million asthmatic. In view of the fact that air pollution is vital cause in the prevalence of asthma and thus asthma is believed to be a disease of civilization, much effort has been directed towards improving the quality of the air we breathe.

**Types of Asthma:**

Asthma exists in two states: The steady-state of chronic asthma, and the acute state of an acute asthma exacerbation. The symptoms are different depending on what state the patient is in. Common symptoms of asthma in steady state include: night time coughing, a chronic throat-clearing type cough, and complaints of a tight feeling in the chest. Severity often correlates to an increase in intensity of symptoms. The intensity of symptoms can gradually increase, up to the point of an acute exacerbation of asthma. It is common misconception that wheezing is common in patients with asthma-some never wheeze, and their disease may be confused with another chronic obstructive pulmonary disease such as chronic bronchitis. An acute exacerbation of asthma is commonly referred to as an asthma attack. The cardinal symptoms of an attack are shortness of breath (dyspnea), wheezing and chest tightness (Saunders,
2005). Although the former is often regarded as the sine quanun of asthma. Some patients present primarily with coughing, and in the late stages of attack, air motion may be so impaired that no wheezing may be heard. When present the cough may sometimes produce clear sputum. The onset may be sudden, with a sense of constriction in the chest, breathing becomes difficult, and wheezing occurs.

In simple terms, Asthma is a disease of the lungs and airway causing difficulty in breathing with sounds of whistle. Asthma is caused by a large number of reasons in which allergy is one of them. Allergy is the swelling of body tissue in reaction to particular substance which comes into contact with either through direct skin contact, ingestion of foods or inhalation of air.

The Mast cell

Enrich (1977) defined mast cells the group of connective tissues which show close relationship of histamine. Histamine secreted by the mast cells play important role in the inflammatory reaction in the body. He termed them plasma cells. Mast cells are immune systems (Watchman) spread across the body and have been used to test for newer agents against allergic disorders and chronic bronchial asthma (Barnes, 1993). When someone has the capability to become allergic and produce
IgE antibodies, the antibody attaches itself to certain cells, called mast cells, in his body. Millions of these mast cells line the wall of a person’s skin, nose and bronchial tubes. Each mast cell contains about a thousand tiny granules these granules are loaded with potent chemicals or mediators, the mast powerful of which are histamine and leukotrienes. Normally the chemicals are held in check within the mast cell, but when an outside antigen enters the body and meets up with the IgE antibody on the surface of the mast cell, the cell explodes its chemicals in to the surrounding tissue. The surrounding tissue then gets very inflamed and swollen. When the mast cells erupt nose, one sneeze, if the skin is the site of eruption, one itch or gets hives. Finally when the lungs are involved we wheeze or itch reaction typifying allergic disease (Hannaway, 1996).

Histamine

Histamine is present in all animal and vegetable tissues. It is a chemical which is secreted by mast cells after they get activated do to offending allergens. This is presence of histamine which causes burning, sensation, redness and inflammation of tissues during allergic response. However when histamine is released, it triggers a series of a dramatic actions. The blood vessels become larger and the speed of the blood flowing through them slows. These changes in size, volume of cells and
blood vessels allows fluid to leak through cell walls. This fluid causes swelling of the surroundings tissues. The inflamed tissues become irritated and swollen. Histamine also causes smooth muscles to contract. The effect of histamine on these muscles can provoke an asthma attack or induce pain in stomach (Gupta, 2000).

**Antihistamines in Asthma**

There is a category of medicine that competes with histamine released after allergic response to nullify its destructive effects on the tissues (Gupta, 2000). Doctors have traditionally been taught to avoid using antihistamines in patients with asthma because of the potential of antihistamines to dry up the secretions in the lungs and worsen asthma. Some patients with mild asthma actually stop wheezing when they take an antihistamine. People who experience increased coughing and wheezing after taking antihistamines should avoid their use.

**The herbal approach to asthma**

The increased popularity of synthetic drugs in the treatment of asthma in recent years has been attributed to their clinically proven efficacy and easy patentability. However, more recently, herbal approaches have regained their popularity, with their efficacy and safety aspects being supported by controlled clinical studies. For example, an
anti-leukotriene drug has recently been approved for the treatment of asthma. The herbal approach offers an effective alternative anti-leukotriene product- a boswellic acid that is derived from *Boswellia serrata*. Herbal alternatives employed against the asthma have proven to provide symptomatic relief and assist in the inhibition of this disease. These herbs therefore have multifaceted roles to play in the management of asthma. By looking to the number of ingredients available in the medicinal plants of different ecological zones of the country.

The selection of two plants was done and their chemical constituents/principles present in them which have a role in the management of asthma. The selected plants were

1. *Achyranthes aspera* L. of family Amaranthaceae

   Common name: Chirchira or Latjira

2. *Euphorbia hirta* Linn. of Family Euphorbiaceae

*Achyranthes aspera* L.:

*Achyranthes aspera* (Common name: Prickly Chaff Flower, Devil’s Horsewhip, Sanskrit: Apamarga) is a species of plant in the Amaranthaceae family. *Achyranthes* is a genus of medicinal and ornamental plants. It is distributed throughout the tropical world. It can be
found in many places growing as an introduced species and a common weed. It is an invasive species in some areas, including many Pacific Islands environments. It is found on road sides, field boundaries and waste places as a weed throughout India up to an altitude of 2100 m and in South Andaman Islands. The plant is also widespread in Baluchistan, Ceylon, Tropical Asia, Africa, Australia and America.

*Achyranthes aspera* L. (Latjeera) is an erect or procumbent, annual or perennial herb of about 1-2 meter in height, often with a woody base. Stems angular, ribbed, simple or branched from the base, often with tinged purple colour, branches terete or absolutely quadrangular, striate, pubescent, leaves thick, 3.8 – 6.3 × 22.5 – 4.5 cm, ovate – elliptic or obovate–rounded, finely and softly pubescent on both sides, entire, petiolate, petiole 6 – 20 mm long, flowers greenish white, numerous in axillary or terminal spikes up to 75 cm long, seeds subcylindric, truncate at the apex, rounded at the base, reddish brown.

The herb is used in Traditional Chinese Medicine practice. *Achyranthes* (Cyathula) has a property that inhibits collagen-induced arthritis and acute edema. Most significantly, two novel triterpene glycosides isolated from achyranthes have been shown to be 1,000 times
more potent than Sialyl Lewis X (SleX), an important blood group antigen that inhibits excess recruitment of neutrophils to injured tissues. This property has made it useful for treating arthritis; when too many white blood cells are recruited to an injured joint the neutrophils attack and destroy healthy tissues, leading to conditions such as septic shock and rheumatoid arthritis.

It is one of the 21 leaves used in the Ganesh Patra Pooja done regularly on Ganesh Chaturthi day. In Uttar Pradesh the plant is used for a great many medicinal purposes, especially in obstetrics and gynecology, including abortion, induction of labor, and cessation of postpartum bleeding. The Maasai people of Kenya use the plant medicinally to ease the symptoms of malaria.

**Euphorbia hirta** Linn.

*Euphorbia hirta* L. Terrestrial, annual, erect herb, up to 60 cm tall. Taproot white or brown. Stem rounded, solid, hairy, with abundant milksap. Stipules present. Leaves simple, not lobed or divided, opposite, sessile or stalked, elliptic, less than 2 cm long/wide, hairy on both sides, denser pilosity along the veins in the lower face, more scattered on the upper side; leaf base asymmetric, margin finely dentate, apex acute, base
INTRODUCTION

acute, 3-veined not to the top. Flowers unisexual, solitary or grouped together in an axillary cyme, stalked, petals absent. Fruit a capsule opening with 3 valves.

Seeds are Oblong, 4-sided prismatic, tiny and reddish in color. Cotyledons shortly petiolated, elliptic, 2mm long 1mm wide, sessile and hairless. First leaves simple, opposite and sub-sessile, elliptic, with asymmetric lamina in the base, and finely toothed margin.

*E. hirta* is a weed of waste places and in crops, occurring up to 2,000 m altitude. It is an invasive plant which spreads very quickly. It is a species of much brightened environment that meets so well on dry grounds as in the wetter zones. However, it is not present in altitude. It prefer the sandy grounds or with gravels. Sunny to lightly shaded, not too moist, grassy sites; along roads, premises, often between stones; locally common. Early colonize of bare land.

The latex of the plant is used to cure some wounds. The stalks and leaves are used to prepare a drink flavoring the milk of young mothers. It is also popular remedy for coughs, coryza, hay fever, bronchial infections and respiratory disorders. In traditional Cambodian medicine, it is given to expel worms, bowel complaints and as a paste for gonorrhoea and other
venereal diseases. A tincture is suitable for spasmodic dyspnoea due to asthma, bronchitis, emphysema and pulmonary, cardiac disorders.

OBJECTIVES:

It was proposed to investigate two medicinal plants with the following aims and objectives:

1. To isolate anti-histaminic or mast cell stabilizing substance from two plants i.e., *Euphorbia hirta* and *Achyranthes aspera*.

2. To find out the histo-pathological changes in the mesenteric tissues of the experimental animals.

3. To investigate the taxonomic and phytochemical details of the two selected plants and their structural elucidations.