CHAPTER I

INTRODUCTION

Inflammation is the complex biological response of vascular tissues against the harmful stimulation, owing to the attack by the pathogens, damaged cells, or irritants. Every organism has the usual protective attempt to remove the injurious stimuli as well as initiate the healing process for the tissue. We cannot say inflammation as the synonym for infection. Even though where inflammation is caused by infection, the two are not similar because infection is caused by an exogenous pathogen, while inflammation is the response of the organism to the pathogen. In the absence of inflammation, wounds and infections would never heal and progressive destruction of the tissue would compromise the survival of the organism. However, inflammation which runs unchecked can also lead to host different kinds of diseases, such as high fever, atherosclerosis, and rheumatoid arthritis. That’s why the inflammation is normally regulated by the body. The causes of inflammation are by burns, chemical irritants (Parslew et al 1997), toxins, infection by pathogens, any type of physical injury and ionizing radiation by foreign bodies, including splinters and dirt etc.

Inflammation results in the liberation of endogenous mediators like Histamine, Serotonin, Bradykinin, Prostaglandins etc. Prostaglandins (Eldeen et al 2005) are ubiquitous substances that indicate and modulate cell and tissue responses involved in inflammation. These mediators even in small quantities can elicit pain response. Pain results in dropped muscular activities.

Some inflammatory diseases include asthma, bronchitis and chronic bronchitis may affect 25 million persons in the United States. Much progress has been made in the last decade in the direction of an understanding of the mechanisms underlying
chronic airway inflammation (Shelhamer et al 1995). Inflammation can be classified into two types one is being acute and another chronic (Marcus 2005). Acute inflammation normally resolves by mechanisms that have remained somewhat elusive. Emerging evidence now suggests that an active, coordinated program of resolution initiates in the first few hours after an inflammatory response begins (Serhan & Savill 2005, Serhan et al 2007). This type of inflammation is the initial response of the body to harmful stimuli of an organism and is achieved by the increased movement of plasma and leukocytes from the blood into the injured tissues. A cascade of biochemical events propagates and matures the inflammatory response, involving the local vascular system, the immune system, and various cells within the injured tissue. Inflammation has very specific characteristics, whether acute or chronic, and the innate immune system plays a crucial role, as it mediates the first response. Infiltration of innate immune system cells, specifically neutrophils and macrophages, characterizes the severe inflammation, while infiltration of T lymphocytes and plasma cells are features of chronic inflammation (Ferrero-Miliani et al 2007). Prolonged inflammation, known as chronic inflammation, leads to a progressive shift in the type of cells which are present at the site of inflammation and is characterized by simultaneous destruction and healing of the tissue from the inflammatory process.

Anti-inflammation refers to the property of a substance or treatment that reduces inflammation. Anti-inflammatory drugs make up about half of analgesics, remedying pain by reducing inflammation as opposed to opioids which affect the brain. Opioid drugs act in both the central and peripheral nervous systems. Within the central nervous system, opioids have effects in many areas, including the spinal cord. In the peripheral nervous system, actions of opioids in both the myenteric plexus and
submucous plexus in the wall of the gut are responsible for the powerful constipating effect of opioids. In peripheral tissues such as joints, opioids act to reduce inflammation (Chahl, 1996).

Algesia (pain) is an ill-defined, unpleasant sensation, evoked by an external or internal noxious stimulus. Pain is a warning signal and primarily protective in nature, but causes discomfort. The most important symptoms of pain that beings the patient to the physician. Unbearable pain acts some other effects like- sinking sensation, apprehension, sweating, palpitation, and raise or fall in BP etc. Analgesics relieve pain as a symptom, without affecting its cause. These treatments relieve pain by acting on the central nervous system or on peripheral pain mechanisms, without significant consciousness alteration (Tripathi & Kaushik, 2000).

An analgesic (also known as a painkiller) is any member of the diverse group of drugs, used to relieve pain (achieve analgesia). The word analgesic derives from Greek an- ("without") and algos ("pain"). Analgesic drugs act in various ways on the peripheral and central nervous systems; they include paracetamol (acetaminophen), the non-steroidal anti-inflammatory drugs (NSAIDs) such as the salicylates, narcotic drugs (Wilson & Poulter 2006) such as morphine, synthetic drugs with narcotic properties such as tramadol, and various others.

In choosing analgesics, the severity and response to other medication determines the choice of agent; the WHO pain ladder, originally developed in cancer-related pain, is widely applied to find suitable drugs in a stepwise manner. The analgesic choice is also determined by the type of pain: for neuropathic pain, traditional analgesics are less effective, and there is often benefit from classes of drugs that are not normally considered analgesics, such as tricyclic antidepressants and anticonvulsants (Collins et al 2000).
Inflammatory diseases including different types of rheumatic diseases are a major cause of morbidity of the working force throughout the world. Although rheumatism is one of the oldest known diseases of mankind and affects a large percentage of population of the world, no substantial progress was seen till the synthesis of aspirin in 1899 by the German Company Bayer, the hint of which also was obtained from a plant, the Willow bark (*Salix alba*) used world wide in folk medicine for the relief of aches, fever and rheumatic pain. Since then many compounds were introduced as a result of laboratory search for drugs with anti-inflammatory activity; though many of them produced a dramatic symptomatic improvement in rheumatic processes, did not arrest the progress of the diseases process and all of them shared the common side effect i.e., gastro-intestinal irritations (Rainsford and Whitehouse 1980).

Rheumatoid arthritis (RA) is an autoimmune disease; immune complexes composed of IgM activate complement and release factors which damage cartilage and erode bone, while PGs produced in the process effect vasodilatation and pain (Tripathi and Nadel 1086). It is a chronic disease in which non-suppurative inflammation which is frequently associated with a variety of extra-articular expression (Kumar *et al*, 2003). RA is one of the diseases where the patient suffered severe pain. The pain may occur in muscles, tendons and joints. Arthritis (Arth-meaning joint, itis- meaning inflammation) is related to rheumatism as rheumatoid arthritis. Rheumatoid arthritis is a chronic disease in which there is a predominant non-suppurative inflammation of the peripheral joints. These include blood-vessel inflammation in the form of tiny areas of necrosis in the fingertips and inflammation of joint-lining tissues. Rheumatoid arthritis typically affects the same joints on the two sides of the body. Almost any movable joint can be involved, but the finger,
wrists and knees are particularly susceptible. Rheumatoid arthritis is about three times as common in women as in men and most common among people in their age of 30s – 50s.

Use of ethno-medicine in India is not a new practice. The North East India, because of its varied topography, climate and altitude etc, is endowed with numerous medicinal plants. The people of this area exist with a valuable heritage of herbal remedies. Its rural people and tribal communities living in remote/forest areas still depend to large extent on the indigenous systems of medicine (Dutta et al, 2005). Many of the reputed plant drugs of potential pharmaceutical value and trade are found even in the wild condition of this region along with many more plant species, being used as crude drug in Indian indigenous system of medicine (Chopra et al, 1958). The tribal and rural populations of India largely depend on medicinal plants for curing their daily ailments. Because of these types of traditional uses of different plants several workers that leads to an array of reports of ethnomedicine. The use of medicinal plants for the treatment of many diseases is associated with folk medicine from different parts of the world. Medicinal plants are the main sources of biochemicals where potential therapeutic activity present that leads to drug development (Halliwell et al, 1988). The research into plants with so-called folkloric use as pain relievers and anti-inflammatory agent is definitely a fruitful and logical research strategy in the search for new analgesic and anti-inflammatory drugs.

Ayurveda was followed by some medical practitioner from ancient system of Indian medicine. Ayurveda is a traditional Indian medicinal system being practised for thousands of years. Considerable research on pharmacognosy, chemistry, pharmacology and clinical therapeutics has been carried out on ayurvedic medicinal plants. Many of the major pharmaceutical corporations have renewed their strategies
in favour of natural products drug discovery and it is important to follow the systems of biological applications to facilitate the process. Numerous drugs have entered the international pharmacopoeia through the study of ethnopharmacology and traditional medicine (Patwardhan 1992, 2000).

The greatest disadvantage in the presently available potent synthetic anti-inflammatory drugs lies in their toxicity and reappearance of symptoms after discontinuation. Therefore, the search for their anti-inflammatory activity is an endless problem (Chawla et al 1987). The search for new anti-inflammatory agents from the vast array of medicinal plant sources is intensifying since they may hold promise for the discovery of therapeutic agents with beneficial effect not just in suppressing relevant aspects of the inflammatory cascade but also on miscellaneous disease conditions where the inflammatory response is amplifying the disease procedure (Iwueke et al, 2006).

In almost every Asian country, there is a vast indigenous knowledge on the use of medicinal plants. Although traditional and local identification systems existed for long, actual and formal scientific identification of these plants started only in the 1900’s. However, as the availability of plant materials was not a problem, very little or no attention was paid by the people to the occurrence, growth habit, distribution and other ecological details of the plants. Only recently, publications regarding the resources of medicinal plants in Asia are becoming available; information on their relative abundance or scarcity, ecological conditions of growth, distribution patterns, etc., are being recorded (Gupta and Chadha 1995; Chandel et al, 1996; Samant et al, 1998; Kumar et al, 2000).

Globally, about 85% of the traditional medicines used for primary healthcare are derived from plants (Farnsworth 1988). Traditional medicine and ethnobotanical
information play an important role in scientific research, particularly when the literature and field work data have been properly evaluated (Awadh et al., 2004). India is one of the richest countries on diverse vegetation with a wide variety of plants with medicinal value. In many countries, scientific investigations of medicinal plants have been initiated because of their contribution to healthcare. Herbal medicines have good values in treating many diseases with minimum side effect.

In Assam there are inhabitants of various ethnic communities with diverse socio-cultural complexities. Here it is maintained one of the oldest and most diverse ethnicity associated with the use of ethno-medicinal plants. The existence and dependency on abundant traditional practices provide a dependable continuum of alternative medicinal system in the state. Many of the reputed plant drugs of prospective pharmaceutical value and trade are found even in the wild condition of this region along with many more plant species, being used as crude drug in Indian indigenous system of medicine. A comprehensive approach should be directed for the development of new botanical products by relying on traditional use of ethno-botanical information meant for detecting biological activity and chemical standardization technologies including optimization of yields of desirable bioactive constituents in plants. Chemical constituents responsible for biological effects are identified and then either isolated and purified in the search for new single entity pharmaceutical ingredients or characterized and standardized in the search for new multi-component botanical products. Proven protocols for clinical monitoring as well as organized and affordable clinical trials must be addressed objectively in herbal drug development (Patwardhan, 2000, Patwardhan et al., 2004). The biological evaluation should be conducted with an aim at supporting the discovery of promising lead compounds by using a combination of mechanism-blind and mechanism-specific
biological assays to detect agents that show novel activity against selected infectious diseases.

THE AREA

Sonitpur district is spread over an area of 5324 sq. kms. on north bank of Brahmaputra river. In terms of area Sonitpur is the second largest district of Assam after Karbi Anglong district. The population of Sonitpur district is 16,77,874 as per 2001 Census. In terms of population it ranks third in Assam after Kamrup and Nagaon districts. The people here are not a homogeneous lot. Rather, they are a mosaic of ethnic groups, an admixture of diverse types of people. The District lies between 26° 30'N and 27° 01'N latitude and between 92° 16'E and 93° 43'E longitude. Located between mighty Brahmaputra River and Himalayan foothills of Arunachal Pradesh, the district is largely plain with some hills. Brahmaputra River forms the south boundary of the district. A number of rivers which originate in the Himalayan foothills flow southwards and ultimately fall in Brahmaputra River.

The name 'Sonitpur' as well as Tezpur literally means "the city of blood". Sir Edward A. Gait (1897) had made reference to the nine line inscription of Harijjar Varma in his "A History of Assam." The inscription is the first recorded history of Assam and dates back to 829 A.D. The inscription was found engraved on a massive stone some two kms away from Tezpur town situated near a temple called Rudrapad.

Formerly this district was under Darang district. At British period Darrang was converted into a district and Mangaldai was made the district Headquarter in 1833. But due to various reasons the British shifted the head quarter to Tezpur in 1835. The district comprised of two sub-divisions, Tezpur sadar sub-division and Mangaldoi sub-division with head quarter at Mangaldoi. The British developed Tezpur as a small garrison township. Later, tea gardens were set-up throughout the district. The old
steamarghat at Jahajghat, the Dak-Bungalow, the then Chummery compound at present Don-Bosco School campus, the Planters Club of Tezpur (Stations Club), the Jahajghat Railway Station, the Church of Ephiphany etc and many tea gardens are some of the examples of the contributions of the British. Darrang district with head quarter at Tezpur continued as an impotant district of Assam.

Towards 1961, Tezpur started to become a center of Trade and Commerce. A year later, in 1962, war broke out with China. The Chinese Army advanced up-to Sessa near Bhalukpung. People started fleeing from their homes. The war had left a bitter experience in the minds of the people of the district. In 1983, Darrang district was bifurcated. Tezpur sadar sub-division was named as Sonitpur district with an outlying Sub-Division at Biswanath Chariali. Mangaldoi sub-division was named as Darrang district. On 15th August, 2000, another Sub-Division namely Gohpur Sub-Division was carved out from the erstwhile Biswanath Sub-Division.

In terms of area Sonitpur is the second largest district of Assam after Karbi Anglong district. In terms of population it ranks third in Assam after Kamrup and Nagaon districts. The people here are not a homogeneous lot. Rather, they are a mosaic of ethnic groups, an admixture of diverse types of people.

**Boundaries**

**North:** The state of Arunachal Pradesh.

**South:** Morigaon, Nagaon, Jorhat and Golaghat districts.

**East:** Lakhimpur District.

**West:** Darrang District. (*Pachnai* river serves as the boundary)

**Physiography**

Located between mighty Brahmaputra River and Himalayan foothills of Arunachal Pradesh, the district is largely plain with some hills.
Fig 1: Map of Sonitpur District showing study area

Rivers

Brahmaputra River forms the south boundary of the district. A number of rivers which originate in the Himalayan foothills flow southwards and ultimately fall in Brahmaputra River.
The Main Plain

The central and southern portion of the main plain is dotted with hills and hillocks, especially near the Brahmaputra River. Important hills include the Agnigarh and the Bhomuraguri. The region has trees and tea-plantations and paddy fields. The northern portion is made up of Forest Reserves and sparsely populated forest-villages. The region abounds in bio-diversity with evergreen and deciduous trees of several types. There is a National Park (*Nameri*), a few Wildlife sanctuaries (*Sonai-Rupai & Bor-Dikorai*), and a number of reserve forests (e.g. *Chariduar, Balipara reserve-forest*). In the extreme north of the region (*Bhalukpung, Sijushah, Pabhoi, etc.*), are hills and hillocks marking the starting of the Himalayan foothills. The main-plain is slightly sloping from east to west, and is at an average altitude of 1800 feet from the mean sea level.

Climate

Sonitpur District falls in the Sub-Tropical climatic region, and enjoys Monsoon type of climate. Summers are hot and humid, with an average temperature of 29° C. The highest temperature is recorded just prior to the onset of Monsoon (around May-early June). Summer rain is heavy, and is principally caused from late June to early September by the moisture-laden South-West Monsoon, on striking the Himalayan foothills of the north. Such rain is both a boon and a bane for the people. A boon, for it provides natural irrigation to the fields; and a bane, as it causes the rivers to overflow their banks and cause floods.

Autumns are dry, and warm. It gets cooler as the months progress.

Winters extend from the month of October to February, and are cold and generally dry, with an average temperature of 16° C. It gets quite chilling in late
December and early January, on account of snowfall in the upper reaches of Arunachal Pradesh.

Springs are cool and pleasant, occurring in the months of late March and April. Of course, during these months, flash rains and thunderstorms are at times caused by cyclonic winds, known in local parlance as *Bordoichila*.

**Table: 1, Rainfall data of Sonitpur district**

<table>
<thead>
<tr>
<th>Months</th>
<th>2006</th>
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<th>2008</th>
<th>2009</th>
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<tbody>
<tr>
<td>January</td>
<td>0</td>
<td>5.4</td>
<td>23.1</td>
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<tr>
<td>February</td>
<td>74.2</td>
<td>101.2</td>
<td>6.3.0</td>
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<td>March</td>
<td>4.6</td>
<td>43.8</td>
<td>76.0</td>
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<tr>
<td>April</td>
<td>137.2</td>
<td>358.8</td>
<td>165.0</td>
<td>98.8</td>
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<tr>
<td>May</td>
<td>195.8</td>
<td>176.2</td>
<td>173.2</td>
<td>271.4</td>
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<td>June</td>
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<td>316.3</td>
<td>299.9</td>
<td>326.9</td>
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<tr>
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<td>214.3</td>
<td>302.8</td>
<td>578.0</td>
<td>227.6</td>
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<tr>
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<td>97.2</td>
<td>318.3</td>
<td>301.0</td>
<td>271.7</td>
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<tr>
<td>September</td>
<td>87.8</td>
<td>367.4</td>
<td>102.4</td>
<td>99.2</td>
</tr>
<tr>
<td>October</td>
<td>37.2</td>
<td>57.8</td>
<td>112.4</td>
<td>105.0</td>
</tr>
<tr>
<td>November</td>
<td>0</td>
<td>21.8</td>
<td>0</td>
<td>15.2</td>
</tr>
<tr>
<td>December</td>
<td>1.6</td>
<td>10.4</td>
<td>4.9</td>
<td>24.7</td>
</tr>
</tbody>
</table>
The climate of Sonitpur district is characterized by hot and humid summer and dry and cool winter. The average annual rainfall is 1742.27 mm (2000-2009) while during the three-month period from October to December average rainfall is only 42.62 mm. The rainy season starts in March and quantum of rainfall as well as number of rainy days increases gradually and reaches maximum in the month of July (Fig 2) and then decline to minimum during November/December. Monthly morning relative humidity always remains above 75 % whereas monthly evening relative humidity varies from 49 % to 73.5 % throughout the year. The monthly average maximum temperatures varies from 23.35 °C to 32.15 °C. (Table2)
Table: 2 Monthly averages of weather parameters for 10 years up to 2009 recorded at BN College of Agriculture, Biswanath Chariali, Sonitpur.

<table>
<thead>
<tr>
<th>Month</th>
<th>Av. Temperature (°C)</th>
<th>Av. RH (%)</th>
<th>Rainfall (mm)</th>
<th>No of rainy days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max T</td>
<td>Min. T</td>
<td>Mor</td>
<td>Eve</td>
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<tr>
<td>January</td>
<td>23.35</td>
<td>8.4</td>
<td>85.5</td>
<td>54.5</td>
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<tr>
<td>February</td>
<td>24.4</td>
<td>10.55</td>
<td>81</td>
<td>49</td>
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<tr>
<td>March</td>
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<td>April</td>
<td>27.8</td>
<td>18.12</td>
<td>80.5</td>
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<td>May</td>
<td>31.1</td>
<td>21.5</td>
<td>82</td>
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<td>June</td>
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<td>July</td>
<td>31.85</td>
<td>24.2</td>
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<td>70</td>
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<tr>
<td>August</td>
<td>32.15</td>
<td>24.3</td>
<td>88.45</td>
<td>73.5</td>
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<td>September</td>
<td>31.4</td>
<td>23.0</td>
<td>83.9</td>
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<tr>
<td>October</td>
<td>29.75</td>
<td>19.3</td>
<td>83</td>
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<tr>
<td>November</td>
<td>27.4</td>
<td>12.9</td>
<td>76</td>
<td>55.5</td>
</tr>
<tr>
<td>December</td>
<td>24.8</td>
<td>8.1</td>
<td>82.9</td>
<td>52.1</td>
</tr>
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</table>

General topography of the North Bank Plains Zone of Assam varies from undulating upland to deeply flooded low-lying plains. The soil of this zone are developed on alluvium derived from river Brahmaputra and its tributaries viz Buroi, Borgang, Jia Bharali, Pachnoi etc falls in Sonitpur district. The soils in this alluvial tract are either Alfisols (old alluvial) or Inceptisols occupying both old flood plains as well as recent flood plains. The soils are of light to heavy texture showing a wide range of drainage behaviour from well drained to poorly drained state under low land situations. The organic matter content and status of available nitrogen and potassium is medium, however available phosphorus content of the soil is low. High soil acidity, high phosphate fixation, excessive drainage, micronutrients deficiency, iron toxicity, periodic soil moisture stress during winter seasons etc are some of the soil related problems of this zone.
Population Data

According to the 2001 Census, the Sonitpur District has a population of 16,77,874 with a density of 315 persons per sq. km. The people here are not a homogeneous lot. Rather, they are a mosaic of ethnic groups, an admixture of diverse types of people.

**Gender** (2001 Census)

Males: 8,64,125
Females: 8,13,749
Total: 16,77,874
Sex-Ratio: 942

**Literacy** (2001 Census)

Literate: 8,52,201
Literacy Rate: 50.79%
Male Literates: 4,94,298.
Male Literacy Rate: 57.20%
Female Literates: 3,57,903.
Female Literacy Rate: 43.98%

Language

Majority of the people have Assamese language as their mother tongue; and the others also use it, as a lingua franca. Other languages spoken are Bodo, Nepali, Bengali and Hindi.

**ECONOMY**

The economy of the Sonitpur district is Agriculture based-the traditional one. The economy of Sonitpur is underdeveloped and has its own pace, trend, tradition and
development process. Sonitpur is trade center for Bomdilla, Tawang, Seppa and Itanagar of Arunachal Pradesh. Tezpur, Dhekiajuli, Rangapara, Biswanath Chariali and Gohpur are important trading centers in the district.

**Agriculture:**

Sonitpur is basically an agrarian economy. Approximately 80 percent of the population depends on agriculture allied (primary sector) activities for their livelihood. Rain fed cultivation of single paddy crop still continues in most areas of the district.

However with the help of irrigation facilities like shallow tube wells, high yielding variety of seeds and tractors have made multiple cropping possible. Both *Rabi* and *kharif* cropping is done in the district.

Paddy, jute, sugarcane, tea, pulses and mustard are the major crops and tobacco, potato, vegetables and fruits like coconuts, banana, pineapples, oranges, and mangoes are subsidiary crops of the district. Rice is the staple food. The farmers mainly depend upon cultivation of wet paddy. Among the cash crops jute is grown on the low lying areas of the bank of the Brahmaputra.

Here three types of rice are grown: *Ahu* (Autumn rice), *Sali* (Winter), *Boro* (Summer).

**Mustard** is normally grown in conjunction with Ahu or riparian Flats.

**Pulse** is grown mainly in alluvial flat lands near the river Brahmaputra.

The following pulses are mainly produced – *Mati-mah, magu-mah, arahar, masur-mah, motor-mah, garo-mah, lesera-mah* etc.

**Horticulture:-**

Sonitpur offers favourable soil and climatic conditions for cultivation of various horticultural crops. In fruits banana, pineapple, citrus, jackfruit, guava & litchi
occupy important places. Coconut and areca nut are predominant plantation crops. In spite of immense potentiality for the development of horticultural crops the commercial horticulture in true sense in the district is yet to have a breakthrough.

Fruits and vegetables growing are highly remunerative. Such cropping is labour intensive and creates scope for engagement of rural labourers and is also suitable for efficient utilization of marginal & unproductive lands. Horticultural products like Lichis of Lichu Pukhuri, Tezpur, Pineapples of Ketekibari, Tezpur, Potatoes of Gingia and green chillies are famous in India.

**Tea Gardens:-**

The next most important feature of the economy of Sonitpur is the existence of large number of tea gardens. There are all together Seventy three tea gardens in Sonitpur district. The area covered under these tea gardens is approximately 2,81,660 Bighas. Monabari near Biswanath Chariali is the largest tea garden in Asia with an area of 1096 hectares with annual tea production of 2632670 Kgs in year 2000.

Most tea gardens were previously owned by European concerns like Mecnill & Magor, George Williamson Ltd., Mcleod Russel, British Assam tea garden company, Empire Plantation Limited. etc. However in recent years many Indian owned companies like Tata Tea, Brooke Bond etc. are taking over the ownership of the tea gardens. Apart from the big companies recently small tea gardens with area of 40 to 100 bighas have come up in many numbers near the big gardens. They basically sell tea-leaves to the big gardens who own factories.

**The Traditional Economy Trend:**

In the district traditional economy provides a big source of income to the people for their livelihood. People rich in traditional activities like and prefer their traditional job.
Following activities are mentioned as Traditional Economy:

**Piggeries:**

Tribals and other weaker sections of the society are traditionally involved in pig rearing in the district. Pig is one of the most efficient feed converting animals having the shortest generation intervals high prolificacy and faster growth rate, all these traits are directly and positively correlated with the overall economy in production. Pig farming as a commercial venture is still to be established in the district.

**Poultry Production:**

The poultry production in district is mainly Desi bird oriented and is mainly in the hands of the rural people who rears mostly the desi or non descript type of poultry.

The indigenous poultry are poor producers under traditional form of management. Inspite of heavy market demand popularity and non easy availability of poultry meat & egg in the market, poultry production has not come up to the desired level.

**Fishery:**

As we know people here are fond of fishes and they catch fishes for their food. Basically fishing here is a tradition rather than commerce, as 90 % fish products are imported. In the district fishery is quite popular commercial activity but it is also not developed to the desired level. River Brhmaputra and about 1000 no. of ponds provide huge scope of fish production.

**Weaving:**

Handloom weaving is an important cottage industry that has been flourishing in Assam from ancient times. It still occupies a place of pride in every Assamese household which invariably maintains a handloom besides other articles for spinning.
and weaving. It is universally practised cottage industry by rich and poor alike and has no stigma of caste or creed attached to it. Most of its products are of utility value.

Muga Mekhala and Riha, decorated blouse piece, Eri chadar etc. are of some of the best specimen of handloom products which show the creative genius of the weavers in Assam, that is called “Fabrics of delicate textures and designs”.

Sericulture:

Chinese records dating as far back as 248 AD mentioned about the trade route from South China through the Shen states. Brahmaputra River and Kamrupa to Pataliputra includes Tezpur. Sonitpur is well known for excellent quality of silk. Here following types of silk are found: Muga, eri and Pat (Mulberry silk)

Sericulture is the most important cottage industry not only of the district but also of the state of Assam. Extensively practised during the agricultural off season as a subsidiary occupation, it occupies an important place in the rural economy of the district. Sonitpur has tremendous scope to develop sericulture.

Gold and Silver Smithy:

This industry is very traditional one. The industry is mainly concentration in the urban areas. The artisans are from families who have been traditionally associated with the industry. The indigenous jewelers exhibit considerable amount of skill and artistic refinement in making golden ornaments such as Dugdugi, galpata, jonbiri, keru, thuria, gamkharu etc.

Carpentry in the rural areas is more or less a subsidiary occupation. Village carpenters do all types of works like furniture making, house building, wooden agricultural equipments like plough, harrow, yoke etc.
Bamboo and Cane work:

Among the traditional crafts the making of bamboo and cane products is perhaps most universally practiced by all sections of the people throughout the state. Its products have wide range of uses and as such commonly found in every household.

This craft has been mainly a household industry and occupied an important place among the handicrafts of the district. It provides a subsidiary occupation of the cultivators and full time occupation to these highly skilled artisans who produce only fine decorative baskets, furniture and mats etc on commercial scale.

Mainly it has been a rural industry that is commonly pursued by the agriculturists in their spare time as a subsidiary occupation; but now a great professional and commercial approach can be seen in this business.

A rich diversity of both of population and flora in the Sonitpur a major district of Assam state has provided an initial advantage to its inhabitants since times immemorial for observing, and scrutinizing the rich flora and fauna for developing their own traditional knowledge. The history reveals that most of the tribal economies have been engaged in subsistence agriculture or hunting and gathering. With the passage of time, they have developed a great deal of knowledge on the use of plants and plant products in curing various ailments. They have a deep belief in their native folklore medicine for remedies and they rely exclusively on their own herbal cure.

The present study pertains to traditional practice related to the treatment of one of the most vexed diseases rheumatism suffered by a sizeable section of our society. Rheumatism is a phenomenon referring to the disease of pain and inflammation. Thus the critical evaluation of sample authentication, analytical and biological characterization, and standardization activities are of paramount importance for
Chapter I. Introduction

effective utilization of medicinal plants of the region. These include the programmatic approaches of medicinal chemistry, structure-activity relationship studies, analytical methods development, pre-formulation and formulation development, biochemical studies and mechanism of action determination etc.

Organization of the thesis:

Following this introductory chapter, which explains the detailed objectives of the research, **Chapter II** presents the Review of available Literature, where it is studied the plants used for anti-inflammation and analgesic properties, some phytochemicals found in these few plants and how it acts as anti-inflammatory on experimented animals model. **Chapter III** focuses on materials and methods of the present works. It covers the collection of the plant materials, its extract preparation and administration to animal model for studying anti-inflammatory nature of herbal mixture. Along with these some phytochemical studies were also mentioned in different parameters. **Chapter IV** covers the Enumeration of ethnomedicinal plants where present a documentation from detail ssurvey of the ethno-medicinally important plants related to their anti-inflammatory and analgesic properties in this district. In **Chapter V** focused the presentation of experimental findings. **Chapter VI** deals with the discussion of the prospective result. The data obtained from the results were analyzed and discussed with relevant references and justify the claim. **Chapter VII** presents a detailed discussion of the whole research work which has been placed as summary and conclusion. Lastly, all the relevant references to the present work are presented in the form of bibliography.