# CHAPTER 3

# *Selection and Identification of Medicinal plants*

## 3.1 Background

Plants are being considered as primary source of therapeutic regimes for treating various forms of infectious and non-infectious ailments from the time of civilization. [181,182] Even though substantial development has been made in pharmaceutical sciences, about 60% of the world population and 80% of the population of developing countries especially of rural habitat still rely on the traditional medicine for their primary healthcare. [183] Also, today 80% of the drugs available in the market are of either natural origin or developed based on the skeleton of naturally occurring compounds. Approximately, half of the arsenal of drugs approved till date are either natural product scaffolds or derivatives thereof. [184] Numerous examples of development of drugs (Paclitaxel, Morphine etc.) form natural products especially from plants have revolutionized the healthcare industry and it has been estimated that world market for herbal medicinal products approaches 90 billion US$ in 2015. [185,186]

The north eastern region of India is inhabited by more than 200 tribes and renowned for its cultural biodiversity. These inhabitants possess rich and unique knowledge on the use of edible medicinal plants as first line therapeutic remedies for treating various forms of ailments including cancer. [187] However, such knowledge on medicinal plants are normally confined to specific geographic region among specific human communities and passes orally from one generation to subsequent and are in constant threat to wipe out due to change in habitats and culture. [184] Only few studies have been found to be document such traditional and indigenous knowledge on medicinal plants and validate them. Such plethora of undisclosed ethnomedicinal and ethnopharmacological knowledge on medicinal plants may serve as source for discovering novel drug molecules and/or complement and alternative therapy to mitigate the recent global demands. However, there is a need for exploration of traditional and indigenous knowledge and their systematic evaluation of pharmacological activities in suitable experimental models. With this background, we have explored the medicinal plants on the basis of traditional and indigenous knowledge from Assam, a state of north eastern region of India and identified three medicinal plants for scientific revalidation of chemopreventive and anticancer potentials.

## 3.2 Methods

### 3.2.1 Study area

All the investigated communities lie in the state of Assam, approximately 50-80 km north from Gauhati, the administrative capital of the state. Filed visits were made to some of the remote villages in the district of Kamrup (R), Baksa, Darrang and Nalbari in 2010 to collect the information on the use of medicinal plants.

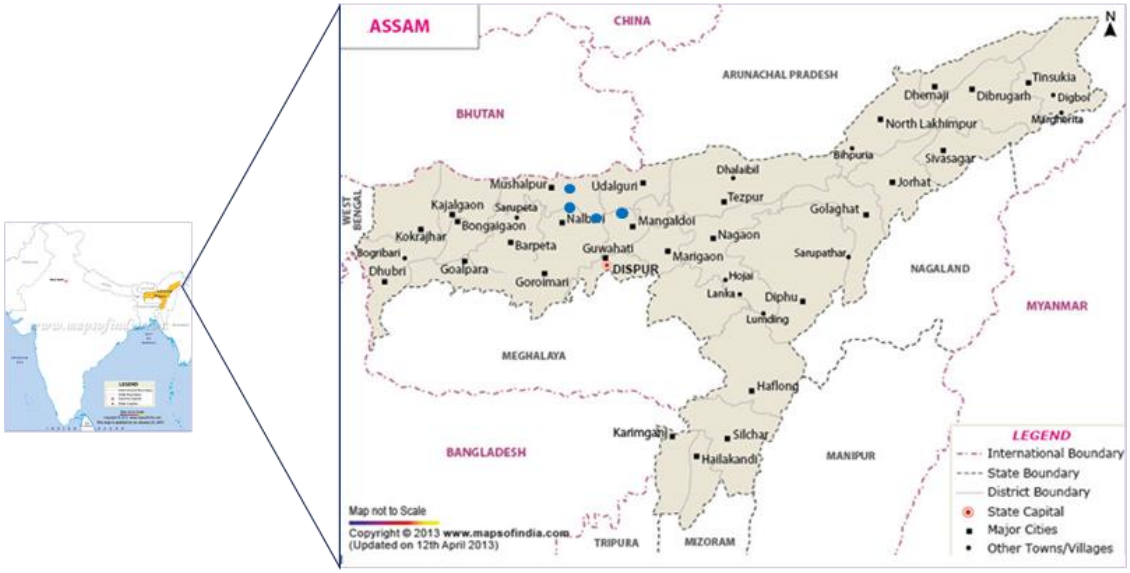


**Figure 10:** Map of Assam showing the investigated area in blue dots
(Source: Maps of India; http://www.mapsofindia.com/)

### 3.2.2 Selection and collection of medicinal plants

The selection of the medicinal plants is based on the traditional and indigenous knowledge of the people of the tribal communities belonging to the selected districts of Assam. The ethno-pharmacological information on medicinal plants that were used as a first line of therapeutic regimes for treatment of cancer like disease were collected from the traditional healers *viz. Kabiraj* or *Bej*, and thereafter consulted with scientific literature related to the identified plants. The parts of the selected medicinal plants were collected from the healthy plants from the Baihata Chariali ($26.442135^0$ N, $91.764606^0$ E) region of Kamrup (R) district of Assam (India).

### 3.2.3 Taxonomic identification and authentication

Two Nos of selected plants were identified and authenticated at Botanical Survey of India (BSI), Eastern Regional Centre, Shillong, Meghalaya (India) vide identification No.: BSI/ERC/Tech./Plant Iden./2015/306, dated August 3rd, 2015 and one plant was identified at the Department of Botany, Gauhati University, Gauhati, Assam (India). Voucher specimen in the form of herbarium for each plant were preserved in our laboratory for future references [Annexure I and II].

## 3.3 Results

Based on the traditional and indigenous knowledge of people of Assam, three medicinal plants were selected [Figure 11-13]. The details of the selected plants are as mentioned below:

1. ***Nyctanthes arbor-tristis* Linn.:**

**Figure 11:** Photographs of *Nyctanthes arbor-tristis* Linn.

Taxonomy of *Nyctanthes arbor-tristis* Linn.:

| | | |
|---|---|---|
| Kingdom | : | Plantae |
| Order | : | Lamiales |
| Family | : | Oleaceae |
| Genus | : | *Nyctanthes* |
| Species | : | *arbor-tristis* |
| Local name | : | শেৱালি ফুল (Sewali) |

### 3.4 Discussion and Conclusion

In the present study, we have identified three medicinal plants *viz. Nyctanthes arbor-tristis* Linn., *Phlogacanthus tubiflorus* Nees. and *Phlogacanthus thyrsiflorus* Nees, based on the traditional and indigenous knowledge of the tribal people of Assam (India). The identified plants were known to possess various biological activities and were claimed to have therapeutic potentials for treating cancer suspected disease. The *Nyctanthes arbor-tristis* Linn (commonly known as Night flowering Jasmine), belonging to the

2. ***Phlogacanthus tubiflorus* Nees.:**

**Figure 12:** Photographs of *Phlogacanthus tubiflorus* Nees.

Taxonomy of *Phlogacanthus tubiflorus* Nees.

| | | |
|---|---|---|
| Kingdom | : | Plantae |
| Order | : | Lamiales |
| Family | : | Acanthaceae |
| Genus | : | *Phlogacanthus* |
| Species | : | *tubiflorus* |
| Local name | : | ৰঙা বাহক / তিতা বাহক (Ronga Bahak/Tita Bahok) |

family Oleaceae has been extensively used in traditional and indigenous system of medicine along with its use in Ayurveda, Siddha, and Unani systems of medicines. The whole plants and different parts have been used traditionally as a herbal remedy for treating several ailments like asthma, cough, rheumatism, high blood pressure, etc. [188,189].

### 3. *Phlogacanthus thyrsiflorus* Nees.:

**Figure 13:** Photographs of *Phlogacanthus thyrsiflorus* Nees.

Taxonomy of *Phlogacanthus thyrsiflorus* Nees.

| | | |
|---|---|---|
| Kingdom | : | Plantae |
| Order | : | Lamiales |
| Family | : | Acanthaceae |
| Genus | : | *Phlogacanthus* |
| Species | : | *thyrsiflorus* |
| Local name | : | ৰঙা বাহক / তিতা বাহক (Ronga Bahak/Tita Bahok) |

Recent pharmacological studies showed that the leaf extract of *Nyctanthes arbor-tristis* possess anti-antioxidant, radical scavenging, anti-malarial, anti-larvicidal and anti-inflammatory activities. [190-194] The bark possesses analgesic and anti-inflammatory activity. [195] The beautiful white flowers are used as stomachic, carminative, astringent, anti-bilious, expectorant, hair tonic and in the treatment of piles. [188,196] The flower extract of *Nyctanthes arbor-tristis* also possess immunostimulatory, antibacterial and cytotoxic activities. [197,198] Also, the people of Thoubal district of Manipur (India) and Chittoor district of Andhra Pradesh (India) widely use the whole plant for treatment of skin related disease and cancer respectively. [199,200] However, no reports are available till date on the chemopreventive and anticancer potentiality of the flowers of *Nyctanthes arbor-tristis*.

The plants *Phlogacanthus tubiflorus* Nees., belonging to the family Acanthaceae is less known in scientific literature. The leaves are used for the treatment of wounds, tumorous growth and as blood purifier (Indigenous knowledge) and flowers are USED for treating cough, stomach ache and scabies. [201-203] Flowers are also used for treating intestinal worms and rheumatism. [204,205] The root decoction is used for the treatment of wounds and cancer like disease by the tribal people of Assam (Indigenous knowledge). Pharmacological studies demonstrated the anti-antioxidative and fecundity reducing activity in the leaf extract [206,207].

The gregarious shrub *Phlogacanthus thyrsiflorus* Nees (family Acanthaceae) is extensively used for its great medicinal value for treating Whooping cough, Menorrhagia etc. [208] The leaf is used to treat allergy, cough, phlegm, asthma, bronchial disorders, Jaundice, diarrhoea, tuberculosis etc. [209,210] The flowers are antidote to pox, used in jaundice, prevents skin diseases like sore, scabies etc. [211] The paste of root is used in case of chronic leucorrhoea. [210-212] There are also reports available on the use of different parts of the plant as anti-septic, insecticide also. [213] The leaf decoction is also beneficial for liver and spleen diseases and used to treat stomach ulcer, intestinal disorder and muscular sprain. [208,214]. The brick red coloured flower is edible and used as vegetable by different ethnic groups of North East India. [215] The flower is used in herbal recipe during ‘Bohag Bihu’, the main festival of

Assam (India) in a belief that it protects from disease throughout the year. [216] Recent Pharmacological studies have demonstrated the antioxidant, analgesic, anti-inflammatory, antidiabetic, hypolipidemic, hepatoprotective, anti-diarrhoeal, anti hyperglycaemic, antianalgesic, antinociceptive and hypoglycemic activities. [210,217-221]

The scientific literature relating to the selected plants clearly demonstrated various biological activity and might serve as a source for discovery of novel drugs with chemopreventive and anticancer potentials.