CHAPTER 1

INTRODUCTION

1.1 A brief ethnomedicinal account of India

1.2 Araceae family

1.2.1 Distribution

1.2.2 A brief account of genus *Alocasia*

1.2.3 Species *Alocasia decipiens* Schott

References
1.1 A brief Ethnomedicinal account of India

From the time of Rigveda (4500-1600 BC) and Charaka Samhita (100 BC), plants have been playing significant role in curing various ailments (Chakraborty et al., 2012). The oldest written evidence of the uses of medicinal plants for preparation of drugs has been found on a Sumerian clay slab from Nagpur, approximately 5000 years old. It comprised 12 recipes for drug preparation referring to over 250 various plants, among which some important alkaloids are also mentioned (Kelly, 2009). The turning point in the knowledge and use of medicinal plants was the early 19th century, when alkaloids was discovered and isolated from poppy (1806), ipecacuanha (1817), strychnos (1817), quinine (1820), pomegranate (1878), and other plants. The discovery, substantiation, isolation of alkaloids, glycosides, etc. marked the beginning of scientific pharmacy. Gradually with the introduction of the advanced chemical methods, other active phytochemicals from medicinal plants were also discovered such as tannins, saponins, etheric oils, vitamins, hormones, etc. (Dervendzi, 1992). The medicinal properties of plant species have made an important contribution in the origin and evolution of various traditional herbal therapies (Kala et al., 2006). Over the centuries, a rich knowledge on the uses of various forest and forest products has been accumulated mainly by the tribal communities (Kala, 2005). Tribes are generally a distinct Ethnic group, usually resides in a definite geographical area, speak a common dialect, and form a sizeable percentage of the total population in certain regions of India (Chakraborty et al., 2010). India possesses a total of around 427 tribal communities, of these more than 130 major tribal communities live in North East India, which is comprised of the 8 states Meghalaya, Mizoram, Manipur, Tripura, Sikkim, Assam, Nagaland and Arunachal Pradesh. The major tribal communities of the North East India have been categorized into sub-tribes and if the sub-tribes are taken into account the total number of tribal groups reach up to 300 (Kala, 2005).

Ethnomedicine, a branch of ethnobotany, provides suitable information regarding useful medicinal plants that can be targeted for sustainable domestication and management (Njoroge et al., 2004). Until the middle of the 19th century, human used plants as their main therapeutic agents and even today almost 80% of the world population relies on medicinal plants for their primary healthcare needs. About 70% population in India, 80% in Pakistan, 65% in Sri Lanka, 90% in Bangladesh, 85% in Burma, and 60% in Indonesia (Shinwari et al., 2000) rely on traditional medicine
(Shrestha & Dhillion, 2003), and about 85% of the traditional remedies are derived from plants (Farnsworth, 1988). Asia represents one of the most important centers of knowledge with regard to the use of plant species for treatment of various diseases. Examples are the Ayurveda, Amchi (traditional healing system of Tibet and mountain areas of Nepal), Siddha, Unani, and Chinese systems of medical care (Karki, 2002; Kala et al., 2004). India and China are two of the largest countries in Asia, which have the richest arrays of registered and relatively well-known medicinal plants (Raven, 1998). In India, of the 17,000 species of higher plants, 7500 are known for medicinal uses (Shiva, 1996). This proportion of medicinal plants is the highest proportion of plants known for their medical purposes in any country of the world for the existing flora of that respective country. Since the Indian subcontinent is well known for its diversity of forest products and the age-old healthcare traditions, there is an urgent need to establish these traditional values in both the national and international perspectives realizing the ongoing developmental trends in traditional knowledge. Apart from health care, medicinal plants are mainly the alternate income-generating source of underprivileged communities (Myers, 1991; Lacuna-Richman, 2002).

In the North Eastern region of India, several workers have contributed significantly in documentation of ethnomedicinal information on plants and consequently many important research publications have emerged. Information on 37 antifertility plants belonging to 26 families used by ethnic communities of three districts of Assam was reported (Kalita et al., 2011). Other major work in the field of Ethnobotany of North East India includes several reports on Mao Naga tribes of Manipur (Lokho, 2012), Zeme tribe North Cachar Hill district of Assam (Rout et al., 2010), Reang tribe of Tripura state (Shil & Dutta Choudhury, 2009) and the Thai-Khamyangs of Assam (Sonwal & Barua, 2011). Other recent and worth mentioning works on the ethnobotany of North Eastern India include comprehensive report on ethnobotany of plant wealth of North East India and ethnobotany of pteridophytes of Assam (Mao, 2009; Sen & Ghosh, 2011). Ethnomedicinal plants used by different tribes of Arunachal Pradesh have also been reported recently (Khongsai et al., 2011).

In the present study, *Alocasia decipiens* Schott has been selected for scientific evaluation. The plant belongs to family Araceae and is one of the less studied plants
in the entire World. The plant is claimed to be used in this region and also used in Nagaland by Angami Nagas as liver protecting agents. Moreover, there is no literature found on this plant regarding its phytochemicals and bioactivities. So, induced by this state of affairs, I have decided to undertake my work on this particular plant. The present collection of plant is the first report from this region and Assam as a whole.

1.2 Araceae family

The Araceae is a large family of monocotyledons which are generally tropical in distribution with 90% of genera and 95% of species restricted to the tropics. This Araceae family has played an important role not only in botanical world but also in economical aspects such as by providing medicinal resources. The medicinal properties, which proved to have a curative effect on certain diseases, indicate that these species have a potential value in medicinal industries. An intensive study has been conducted to locate and subsequently conserve the genetic resources of these species since early 1990s. The family is well known for cultivating several foliage and flowering plants like *Philodendron*, *Monstera*, *Spathiphyllum*, *Anthurium*, etc. A number of food crops also belong to this family; important among them are *Xanthosoma*, *Colocasia*, *Amorphophallus*, etc. One of the important characters of the family is its inflorescence structure; small flowers born on fleshy axis (spadix) and subtended by a modified leaf (spathe) (Boyce, 1995). Majority of the members of Araceae contain crystals of calcium oxalate which are often known for causing intense irritation when handling or consuming raw. However, this statement is contradicted by the fact that although irritation generally is not produced by properly cooked plants, the crystals remain even after heating. So, other compound must therefore be involved which causes this reaction. An intensive study on *Dieffenbachia* confirmed that a proteolytic enzyme and other compounds are responsible for the severe irritation caused by this plant and the raphides of calcium oxalate do not play major role (Adritti *et al*., 1982).

1.2.1 Distribution

So far as distribution of Araceae is concerned, the family includes 118 genera and approximately 3500 published species distributed throughout the world (Boyce & Croat, 2011). The genus *Alocasia* includes approximately 113 species (Nauheimer *et al*., 2012). The genus *Alocasia* (Schott) G. Don (Araceae) is a medium-sized perennial
herb to rarely arborescent and gigantic. The natural range of *Alocasia* extends from India and Sri Lanka through Indochina to China and southern Japan, the Malay Archipelago and Oceania; a single species is indigenous in Australia. (Weightman, 1989; Mayo et al., 1997). In India, *Alocasia* has wide distribution in Darjeeling, Sikkim, Himalaya, Khasia Hills, Assam and Meghalaya of eastern India and Bhutan (Sultana et al., 2011).

### 1.2.2 Genus *Alocasia*

*Alocasia* plants are complex in their vegetative and floral structure which prefers to grow in the lowland forest but a few species grow above 1000 m altitude or in light-gaps, clearings, or secondary vegetation (Boyce, 2008). The plants are generally small herbs but some may be thick-stemmed massive plants with huge leaves also.

The stem of *Alocasia* is a unbranched sympodium. The number of foliage leaves per module is variable among the individuals. The petiole is divided into three principal veins - the anterior costa (midrib) and two posterior costae, as it runs in the lamina. The shape of the posterior lobes of the leaf is sometimes of diagnostic importance. Secondary venation arises direct from the costae and from the primary veins and is typically colocasioid. In some species the secondary veins unite between the primary veins into more or less sinuous interprimary collective veins. In majority of the species, the rhizomes are produced at or below soil level. Except in the smallest species the vegetative module is terminated by a synflorescence composed of pairs of inflorescences. Each pair consists of a cataphyll subtending a terminating inflorescence (i.e., peduncle with spathe and spadix). The spathe is divided into a convolute thicker lower portion – the ‘lower spathe’ – which houses the female zone of the spadix and which persists into fruiting and a thinner, ephemeral open limb. The two portions of the spathe are differentiated by a constriction. The spadix is generally protogynous in Araceae. At the time of stigma receptivity, the spathe loosens, to make way for pollinators. There is a sterile zone between the male and female zones of the spadix. As the fruits develop and expand, the peduncle generally elongate and the lower spathe enlarge, sometimes becoming conspicuously coloured. When the fruits ripen, the fruiting spathe dehisces to reveal orange to red fruits. The fruits are
odourless, fleshy and contain one to several seeds a few millimetres in diameter (Boyce, 2008). Seed dispersal is generally by birds and pollination by drosophilid flies (genus Colocasiomyia) that use the spadices as breeding sites (Ivancic et al., 2005, 2008; Sultana et al., 2006).

1.2.3 *Alocasia decipiens* Schott – a new record from Assam

*Alocasia decipiens* Schott, a species of genus *Alocasia* is a native of Indonesia and distributed from Bangladesh to Myanmar and Andaman Island (India). In reviewing pertinent literature, including published books as well as web based resources, it is believed that the present collection of the plant represents the first voucher from Southern Assam and also from Assam as a whole.

The plant is a perennial, upright, herbs with 1-2 m in height and around half meter in width. Rhizome cylindrical, brownish, 15-16 cm in length, 7-8 cm in thick Leaves simple, obovate in shape, leaf margin undulate, leaf blade 25-35cm in length, 17-20 cm in wide, venation palmate, deep green in color, peltate, petiole long smooth 30-35 cm, green in color, Inflorescence is in the form of a spadix, subtended by a white color spathe, Flowers are sessile, small, naked. Fruits are red berries.

Flowering period is November - December.
Systematic position of *Alocasia decipiens* Schott (Species 2000 & ITIC Catalogue of life, 2013)

Kingdom-Plantae
Subkingdom-Tracheophyta
Division- Magnoliophyta
Class- Liliopsida
Order-Alismatales
Family-Araceae
Genus- *Alocasia*
Species- *decipiens* Schott
Fig. 1.1 (A), (B) *Alocasia decipiens* Schott in natural habitat, (C) Dried *A. decipiens* in herbarium sheet
References


