Summary

Since time immemorial man made use of plants in the treatment of diseases. The pharmacopoeias of many countries of the World even today include a large number of drugs of plant origin. The history of medicinal plants dates back to Rigveda, perhaps the oldest repository of human knowledge, which was written in about 4500 – 1600 B.C. Over 9500 wild plant species used by tribals for meeting the varied requirements have been recorded so far. Out of 7500 wild plant species used by tribals for medicinal purpose, about 950 are found to be new claims and worthy of scientific scrutiny. Out of 3900 or more wild species used as edible (as subsidiary food / vegetables) by tribals, about 800 are new information and at least 250 of them worthy of attention of developing as alternative source of food that the world would need in near future.

Ethno-medicobotanical investigations on individual plant or parts of plants were also carried out by a number of workers. As the North East India has a sizeable population of biodiversity, investigations on their Ethno-botanical aspects have been made so far by different research workers.

*Basella alba* and *Basella rubra* is a perennial vine found in the tropics where it is widely used as a leaf vegetable. It is a typical of leaf vegetables, high in vitamin A, vitamin C, iron, and calcium. It is low in calories by volume, but high in protein per calorie. The succulent mucilage is a particularly rich source of soluble fiber. Among many other possibilities, Malabar spinach may be used to thicken soups or stir-fries with garlic and chili peppers.
Malabar spinach can be grown from seeds or cuttings. While not essential, the vine should be trellised. Two vines are sufficient to supply a small family all summer and fall. Vines are somewhat ornamental, so can be trained to climb over doorways for easy accessibility. The thick, fleshy leaves are cut off together with some length of stem to keep the plant pruned to a desired shape. Stems that are too tough to eat can be put back in the soil and rerooted. Plants started in Gainesville in August made excellent growth during the fall months.

Although not extensively, yet some workers have studies some of the physico-phyto-chemical properties of the plants. The extracts of leaves of Basella L. does not respond to alkaloid test by dragendoff’s reagent. However presence of steroids were reported. In methanol and water extract the steroid was found to be in the form of glycoside. By chemical reactions these steroids and steroid glycoside were found to contain many functional groups.

Motivated by some of the interesting results obtained on critical examination of literature, investigation on the Phytochemical and Biological Studies of two plants Basella alba and Basella rubra of Assam were undertaken, the results obtained is compiled in the form of this thesis.

The Plants

Basella rubra Linn. is a glabrous herb with fleshy twinning stems often tinged with red. Leaves alternate, petioled, broadly orate to orbicular, entire, base often cordate, shining, 2-7 in diameter, narrowed into the petioles. Spikes – 1-6 in., axillary, peduncled, simple or branched; flowers – spicale, sessible, 2-sexual, red in cymose clusters. Fruit of the utricle size of a small pea included within the fleshy perianth which is shining black with reddish juice.
Basella alba is a perennial, creeping or climbing herb, 2-10 m long. Stems angular, green, glabrous, multibranch ed, fleshy or thin; leaves entire, broad-ovate to cordate or orbicular, 5-18 cm in diameter, glossy, succulent; flowers in lax, axillary, peduncled spikes with white to green fleshy perianth.

The basic difference between the white variety and the red variety is that the plant of the red variety is purple colour and its flower is reddish in colour but the white variety plant is green in colour and the flower is white in colour.

Collection of Plants

The plants were collected from the local market of Fatakabazar in Silchar, Rangirkhari and Meherpur located in south of Cachar District and Shyama Prasad Road, Lala town, Hailakandi in the state of Assam, India during April to August 2002.

Phytochemical screening

The whole extracts were screened for the presence of Alkaloid, Steroids, Terpenoids, Saponins, Flavonoids and Glycoside according to the literature methods.

Isolation and Characterization of principles

For isolation of components, the dried powdered shells, leaves and seeds of Basella rubra Linn. and the dried powdered stems and leaves of Basella alba Linn. were defatted with hexane and subsequently extracted with acetone. The extracts, on removal of the solvent under reduced pressure, were separated and purified on silica gel column. The isolated fractions were subjected to preparative TLC. One compound (3) from the shell, three compounds (4, 5, and 6) from the seeds and four compounds (5, 7, 8, and 9) were isolated from the leaves of Basella rubra Linn.; and two
compounds (10 and 11) from the stems and two compounds (12 and 13) from the leaves of *Basella alba* Linn. were also isolated. The compounds with significant quantity were purified by preparative TLC and subjected to spectroscopic analysis for characterization. From the various fraction thus obtained, β-sitosterol, Stigmasterol Glucoside, β-sitosteryl- D-Glucoside, Bassic acid and methyl ester of Bassic acid were detected and identified for the first time in these plants.

**Extraction of Seed Oil**

Dry seeds were ground in a mill and oil was extracted by shaking ground seeds in a shaker with hexane in a sealed container. The extract was applying suction. Residue was subjected to re-extraction, each time followed by filtration. The pooled filtered extracts were subjected to rotary vacuum evaporation. The resulting oil was transferred to amber bottle and last traces of solvent were removed by a nitrogen purge followed by continuous vacuum application overnight at ambient temperature.

The physico-chemical parameters of seed oil of *Basella rubra* L viz., **Colour**, Odour, Melting point, Specific gravity, Viscosity, Refractive index, Saponification value, Iodine value, Peroxide value, Free Fatty Acid and Non-saponifiable fraction were determined by standard methods.

**Antimicrobial and Antifungal Studies**

The anti bacterial and anti fungal studies were carried out for the seed oil of *Basella rubra*. The **antibacterial studies** carried out for the extracts were done systematically against four strain of bacteria (2 gram positive: *Bacillus pertusis* and *Staphylococcus aureus*; 2 gram negative : *Escherichia coli* and *Vibrio cholarae*) by Agar diffusion method in particular paper disc method. The standard drug
(Tetracycline) solution was made in DMF in 200 micro μg/ml. The antifungal studies were carried out for one strain of *Candida albicans* by Agar diffusion method, in particular paper disc method. The zones of inhibition were observed and recorded. The standard drug solution was made in DMF (200 μg / ml). The test organism was subcultured in fresh Sabaraud Dextrose Agar (SDA) media, composition of which is given below. The SDA media prepared was first sterilized at 121°C (15lb/sq. inch) for 15 minutes by autoclaving. Microbial inhibition was in the order *E.coli* (12.57±0.99), *A. niger* (11.68±0.71), *V. cholera* (11.42±0.60), *S. aureus* (10.71±0.46), *S. typhi* (9.80±0.90) respectively with all the extracts. The extracts were not able to inhibit the growth of *P. aeruginosa*.

**Hepatoprotective activity of Basella rubra seed oil**

Adult albino Swiss male mice weighing between 18-22 gm were used for the study. The animals are divided into four groups. Each group contains six animals. Normal saline solution is used as vehicle. All the animals received four doses of administration, where anaesthetised after 12 hours of the last dose by diethylether. Blood sample were collected by penetrating the retro-orbital plexus. The serum was separated after coagulating at 37°C for 30 minutes and centrifuged at 250 r.p.m for 10 minutes.

SGOT, SGPT, Alkaline phosphate, Total bilirubin and Direct bilirubin content were determined for every animal. Biochemical investigation on animals using *Basella rubra* seed oil apparently did not reveal toxic sign. General health conditions and serum biochemical profile of vital organs remained within normal variations.