SUMMARY AND CONCLUSION

This thesis entitled “Pharmacognostical, Phytochemical and Pharmacological Evaluation of Two Coastal taxa of Thoothukudi District, Tamil Nadu” deals with pharmacognostical characters, phytochemical profile, and pharmacological potential of the coastal taxa *Sesuvium portulacastrum* and *Sauropus bacciformis*. A perusal of literature reveals that only fragmentary reports are available on *Sesuvium portulacastrum* but for *Sauropus bacciformis* this study is designed for first time for the evaluation of pharmacognosy, phytochemistry and pharmacology in order to establish its medicinal importance and folklore claims.

The proposed work comprises of the following aspects of the medicinal plants, *Sesuvium portulacastrum (L.)* L and *Sauropus bacciformis* L. Airy Shaw

- Study of macroscopic and microscopic characters of *Sesuvium portulacastrum* and *Sauropus bacciformis*

- Pharmacological characterization and HPTLC profiles of whole plant methanolic extracts of *Sesuvium portulacastrum* and *Sauropus bacciformis*

- GC-MS analysis of leaf and stem methanolic extracts of the two selected taxa.

- Evaluation of proximate nutrient and mineral composition to ascertain their usefulness as food and nutraceutical.

- Antioxidant studies of leaf and stem extracts of *Sesuvium portulacastrum* and *Sauropus bacciformis* in different solvents by different radical scavenging methods.
Pharmacological studies on the whole plant methanolic extracts of *Sesuvium portulacastrum* and *Sauropus bacciformis* for anticancer, antidiabetic, hepatoprotective and antiinflammatory activities.

Plants are the potential source for bioactive compounds with varied pharmacological activities. After the identification such plants of potential use in medicine it becomes necessary to examine the various pharmacognostical characters of the plant before further investigation. In pharmacognostical studies, the macroscopic and microscopic and physicochemical constant analysis is carried out. Pharmacognostical standards obtained during the observation are valuable tools for identification of plants.

The various distinguishing features of the plants observed through macro and microscopic studies are:

- *Sesuvium portulacastrum* is a coastal sand dune herb. Stem with thick prostrate, smooth reddish to green stem, Leaves opposite glossy green, fleshy, midrib not prominent. Flowers bisexual, pink. *Sauropus bacciformis* is annual coastal herb with erect stem. Leaves alternate, subfleshy and glabrous. Flowers unisexual, yellow green, monoecious. Fruits capsule.

- In *Sesuvium portulacastrum* leaf is isobilateral, amphistomatic. The mesophyll consists of vertically elongated palisade at both side and compact spongy parenchyma and single collateral vascular strand. In *Sauropus bacciformis* leaf is dorsiventral hypostomatic. The mesophyll consists elongated palisade on the upper side and loosely arranged
spongyparenchyma on the lower side with single prominent vascular bundle.

- The stem of *Sesuvium portulacastrum* is circular with fairly even in outline. It consists of an epidermal layer, wide cortex thin hollow vascular cylinder and wide pith. The stem of *Sauropus bacciformis* is squarish in outline. It consists of epidermal layer, wide cortex and vascular cylinder and pith.

- Sand crystals are fairly common in the leaf of *Sesuvium portulacastrum*. In *Sauropus bacciformis* large are calcium oxalate druses are abundant in the ground cells of the midrib.

- The microscopical examination of the leaf and stem powder shows tannin content, oil globules, trichomes, tracheids vessels and fibres.

The physicochemical parameters such as ash values, extractive values, and moisture content are found to be substantiate its standard values. Any significant deviation in the percentage of any parameters reported in this work may indicate adulteration or substitution of the drug. The fluorescence analysis is also a part of diagnostic tool in the identification of crude drug.

The phytochemical profile of the leaf and stem extracts are studied by qualitative chemical analysis, HPTLC and GC-MS analysis

Preliminary phytochemical investigations reveal the presence of alkaloids, flavonoids, phenols, saponins, tannins, sugars, steroids, terpenoids and glycosides from the leaf and stem extracts of *S. portulacastrum and S. bacciformis*. The HPTLC studies carried out confirm the presence of important phytochemicals like alkaloids, phenols, steroids and flavonoids. HPTLC fingerprint is a versatile tool for the
qualitative and quantitative analysis of active phytoconstituents. It is also a diagnostic method to find out the adulterant and to check the purity of the drug.

The GC-MS analysis of leaf and stem extracts of *Sesuvium portulacastrum* and *Sauropus bacciformis* also reveals the presence of biologically active phytocomponents. Nine phytoconstituents are identified in the methanolic leaf extract of *Sesuvium portulacastrum* and eight compounds in stem. Ten phytoconstituents are identified in leaf extract of *Sauropus bacciformis* while four compounds in stem. Some bioactive phytocomponents present in *Sesuvium portulacastrum* are Vitamin E, I-Monolinoleoyl glycerol trimethysilyl ether.

Antioxidant or free radical scavenging activity of leaf and stem extracts of these selected medicinal plants in different solvents are investigated by using methods like DPPH, Hydroxyl, Superoxide and ABTS radical scavenging and by reducing ability of the extracts. The antioxidant activity is high in methanolic extract of both the taxa and it is dose dependent.

Pharmacological activity deals with the screening of acute toxicity study, anticancer, antidiabetic, hepatoprotective and antiinflammatory activity of methanolic whole plant extracts of *Sesuvium portulacastrum* and *Sauropus bacciformis*. Acute oral toxicity studies in mice are carried out as per OECD guidelines 423. The highest dose that is safe in mice is 2000 mg/kg body weight for leaf methanolic extracts of both the plants studied and 150 mg/kg b.wt and 300 mg/kg b.wt are selected as lower and higher doses.

The methanolic whole plant extracts of both the taxa studied show promising anticancer, antidiabetic, hepatoprotective and antiinflammatory activities in the dose
dependent manner. The pharmacological activities established by the test extracts can be investigated in the future to get their meaningful extension in clinical use.

This study reveals the efficacy of the crude drug and it would definitely have wide scope in future. The findings of the present study will stimulate further research in the field of phytochemistry and clinical applications of the bioactive compounds of *Sesuvium portulacastrum* and *Sauropus bacciformis*. The high proximate nutrient composition and mineral content of both the taxa also make them a potential nutraceutical that is suitable for fortification of foods.

**RECOMMENDATIONS**

In the light of the findings of the present study it can be recommended that

- Since the pharmacological activities are carried out with crude methanolic extracts, further studies are required to isolate and identify the active principles responsible for pharmacological potential.

- The phytocomponents of these plants could be developed as lead compounds which act as a pharmacological tool for designing drugs to treat cancer, liver diseases and diabetics.

- Additional clinical trials need to be performed to find out the toxicity, safety profile to ascertain the dose and absorption pattern in the body.

- The exact mechanism of action of the phytocomponents responsible for pharmacological activity should be identified using new pharmacological technologies.

- *Sesuvium portulacastrum* and *Sauropus bacciformis* have considerable nutritional status and pharmaceutical importance. So these plants can be
used as a novel source of nutraceutical and a good promise for producing new and unique healing functional product in future.

- Steps should be taken to promote the cultivation of these underutilized taxa in the coastal habitat.