

CHAPTER 5

*SUMMARY AND
CONCLUSION*

5 SUMMARY AND CONCLUSION

The need for monographs of plant groups is of increasing importance. It will be providing all the details of a particular group, family or genera which will definitely help us to utilise the natural resources completely and effectively.

The present study entitled “Biochemical Characterization and Pharmacognostic Analysis of selected members of South Indian Phytolaccaceae” is a comprehensive evaluation of the selected samples. It incorporates biochemical, pharmacognostic and antimicrobial investigations along with the analysis of phenotypic variation and genetic diversity of different accessions of the South Indian representatives of the family Phytolaccaceae.

Biochemical studies revealed the presence of various primary and secondary metabolites. Among the primary metabolites carbohydrate concentration was found to be higher in *Phytolacca octandra* L. than in the other two genera studied. But high amount of protein was observed in *Petiveria alliacea* L. than the other two samples studied.

Even though the amount of photosynthetic pigments was high in *Rivina humilis* L., high photosynthetic efficiency was observed in *Phytolacca octandra* L. This justified the high concentration of carbohydrate in this plant.

Electrophoretic analysis of polypeptides carried out by SDS-PAGE method revealed no striking differences in the polypeptide profile of the three plants under study. In all the three plants a prominence of low molecular weight polypeptides was observed.

The amount of total free amino acids was found higher in *Phytolacca octandra* L. and *Petiveria alliacea* L. than *Rivina humilis* L. The HPLC analysis of amino acids showed that the South Indian representative of the family Phytolaccaceae are rich sources of essential and non-essential amino acids except the essential amino acid cysteine. The young leaves of selected species of *Phytolacca* are used as vegetable and commercially the poke salad is prepared from young shoots of *Phytolacca americana* L. The presence of amino acids, both essential and non-essential, in a vegetable enriches its dietary value, since dietary protein must be balanced with essential amino acids.

Pharmacognostic studies conducted include preliminary pharmacognostic evaluation of the samples and phytochemical screening of phytoconstituents. Antimicrobial studies also were conducted. The macroscopic and microscopic features of the samples analysed showed that almost all the characters are similar in the samples studied. But *Rivina humilis* L. was different from *Phytolacca octandra* L. and *Petiveria alliacea* L. in some aspects. The differences are not very significant.

Quantitative phytochemical screening confirmed the presence of different phytochemicals such as alkaloid, flavonoid, resin, tannin, saponin, and bitters in all the selected genera. Volatile oil was found absent in all the plants. Saponin was present in *Phytolacca octandra* L. and *Petiveria alliacea* L. But it was absent in *Rivina humilis* L. High concentration of alkaloids, flavonoids, resin and tannin were observed in *Phytolacca octandra* L. compared to the other two genera.

HPTLC analysis was also conducted to study the phytoconstituents. Gallic acid, benzoic acid and sterol were detected in *Petiveria alliacea* L. and *Rivina humilis* L. But gallic acid and sterol were absent in *Phytolacca octandra* L.

The different phytoconstituents present in the plants are responsible for the antimicrobial actions. Root and shoot extracts were analysed separately to study antimicrobial action. Hexane, chloroform and methanol were used to extract the phytoconstituents. Antibacterial and antifungal studies were carried out to analyse the bioactivity. The studies revealed that the plants under study possess high antimicrobial activity. Streptomycin and Fluconazole were used as standards in antibacterial and antifungal studies respectively.

The South Indian members of the family Phytolaccaceae are found to have high concentration of phytochemicals, which are biologically active

and potent. The present study therefore underlines the importance of complete exploitation of the potency of the members of the family Phytolaccaceae in the field of medicine and chemical industry.

Analysis of phenotypic variation among accessions of each sample was carried out by correlation analysis and ANOVA. The results did not support the presence of morphological ecotypes in the different localities of the samples.

Genetic diversity analysis among the accessions was conducted by RAPD analysis. The results were analysed by UPGMA, and found that the samples were falling in 3 different clusters. The genetic diversity analysis indicated presence of ecogeographical variations. The differences observed among the accessions may be due to interactions of climatic or edaphic factors or may be due to difference in ploidy level. The present study is a preliminary analysis on the family. It is concluded that the South Indian representatives of the family Phytolaccaceae are potent source of phytoconstituents. Further studies on other areas are also necessary to suggest a redistribution of the members of the family.