Mangroves are specialised ecosystems developed along estuarine sea coasts and river mouths in tropical and subtropical regions of the world, mainly in the intertidal zone. Hence, the ecosystem and its biological components is under the influence of both marine and freshwater conditions and has developed a set of physiological adaptations to overcome problems of anoxia, salinity and frequent tidal inundations. This has led to the assemblage of a wide variety of plant and animal species of special adaptations suited to the ecosystem.

The path of photosynthesis in mangroves is different from other glycophytes. There are modifications or alterations in other physiological processes such as carbohydrate metabolism or polyphenol synthesis. As they survive under extreme conditions of salinity, temperature, tides and anoxic soil conditions they may have chemical compounds, which protect them from these destructive elements. Mangroves are necessarily tolerant of high salt levels and have mechanisms to take up water despite strong osmotic potentials. Some also take up salts, but excrete them through specialised glands in the leaves. Others transfer salts into senescent leaves or store them in the bark or the wood. Still others simply become increasingly conservative in their water use as water salinity increases. A usual transportation or biosynthetic path as other plants cannot be expected in mangrove plants.

In India, the states like West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Andaman and Nicobar Islands, Kerala, Goa, Maharashtra, and Gujarat occupy vast area of mangroves. Kerala has only 6 km² total mangrove area with Rhizophora apiculata, Rhizophora mucronata, Bruguiera gymnorrhiza, Bruguiera cylindrica, Avicennia officinalis, Sonneratia caseolaris, Sonneratia apetala and Kandelia candal, as the important species present, most of which belong to the family Rhizophoraceae.
Rhizophoraceae mangroves are ranked as “major elements of mangroves” as they give the real shape of this unique and interesting ecosystem and these mangrove species most productive and typical characteristic ecosystem of World renowned. It was found that the Rhizophoraceae mangrove extracts exhibit several bioactive properties. Various parts of these mangroves are used in ethnomedicinal practices. Even though extracts from these mangroves possess therapeutic activity against humans, animal and plant pathogens, the specific metabolites responsible for these bioactivities remains to be elucidated. Various parts of these mangroves are used in ethnomedicinal practices. There is a gap of information towards the chemistry of Rhizophoraceae mangroves from Kerala.

Thorough phytochemical investigation can achieve the validity of ethnomedicines as well as apply the use of mangrove plants in the development of new drugs. Such studies can pave a firm base for their use in biomarker and chemotaxonomic studies as well as for the better management of the existing mangrove ecosystem. In this study, the various chemical parameters including minerals, biochemical components, bioactive and biomarker molecules were used to classify and assess the possible potentials of the mangrove plants of the true mangrove family Rhizophoraceae from Kochi.

The thesis is divided into six chapters. Chapter 1 is the introduction and reviews the chemical compositions as well as bioactivities of mangrove plants belonging to Rhizophoraceae family. It also deals with aim and scope of the present study. Chapter 2 provides the details of the plant materials and the analytical methodology adopted.

Chapter 3 is devoted to elemental, isotopic, mineral and biochemical compositions of the plants under consideration in order to evaluate the basic chemical nature of the plants for their classification. Chapter 4 gives the idea of occurrence of food flavonoids and their role in determining the nutritive, taxonomic as well as bioactive role in mangroves.
Chapter 5 deals with the variations in fatty acid profiles of common Rhizophoraceae mangrove species found in Kochi with the aim of determining if differences occur in the fatty acid profiles of mangrove tissues and examining the prospect of using individual or groups of fatty acids as taxonomic markers and biomarkers. Chapter 6 mainly deals with the distribution of alkanes and analyses their relevance as a chemotaxonomic tool.

The salient features of the present investigation are summarised at the end of the thesis.
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