During the last few decades natural products research has advanced tremendously through the field of chemistry, food science and materials sciences. Comparison of natural products from microorganisms, lower eukaryotes, animals, higher plants and marine organisms are now well documented.

Natural products are ubiquitous in our everyday life. Some are active constituents of many medicines, vitamins, food additives flavor and fragrance, agrochemical and pesticides. Indeed natural products are essential components of our life itself, which include carbohydrates, nucleic acids, lipids, vitamins, hormones, steroids, prostaglandins etc.

With the advent of improved chromatographic separation techniques, the separation of various natural products including positional and stereo isomers is achieved routinely. Newer spectroscopic techniques such as two-dimensional high resolution Nuclear Magnetic Resonance Spectroscopy, Infrared and Raman Spectroscopy, X-ray crystallography, high-resolution electron microscopy and mass spectrometry have simplified the structural elucidation of new natural products.

The secondary metabolites function as medicines, fungicides, perfumes and flavoring agents. Many compounds from plants and their derivatives were incorporated into modern medicine. The healing action of traditional medicine
such as Ayurveda can be scientifically explained on the basis of phytochemical studies.

The work presented in this thesis deals with chemical investigation of the barks and seed oils of *Macaranga peltata*, analysis of essential oil from leaves of three varieties of *Piper betle*, analysis of essential oil of flowers of *Hyptis capitata* and *Pogostemon Paniculatus*, analysis of essential oil and evaluations antimicrobial properties of *Litsea lavigata* fruit essential oil and its column chromatographic fractions.

This thesis is divided into five independent chapters and relevant references are given at the end of each chapter.

The first chapter is divided into two sections. Section 1 deals with the extraction of 3-acetylaleuritolic acid from both male and female plants of *Macaranga peltata*. The acid catalysed lactonisation of 3-acetyaleuritolic acid is also investigated. In section 2, single crystal X-ray analysis of 3-acetylaleuritolic acid is presented.

The second chapter deals with the analysis of fatty oils present in the seeds of *Macaranga peltata*. Important chemical parameters such as acid value, unsaponifiable matter, iodine value, saponification value, acetyl value, Reichert-Meissl value, Polenske value and peroxide value and physical parameters such as specific gravity, refractive index, melting point, titer and viscosity were determined. The composition of the fatty oil was determined by the GC-MS analysis of the fatty acid methyl ester prepared from the oil.
The third chapter consists of analysis of essential oils from leaves of three different cultivars of *Piper betle* namely, nadan, selan and kuzhikkodi by GC and GC-MS. Forty, thirty eight and forty three compounds respectively could be identified in them. Safrole was the major component in nadan and kuzhikkodi while in selan it was eugenol. This work has been published in papers entitled “Analysis of Essential oil of *Piper betle L.* Leaves from South India Using GC/FID, GC/MS and Olfactometry” Scientia Pharmazeutia, Austria. 67, 305-312 (1999) and “piper betle –Composition of leaf oils in three varieties from Kerala” Indian perfumer 45 (3) 255-257.

The fourth chapter consists of the essential oil composition of flowers of *Pogostemon paniculatus* and *Hyptis capitata* were analysed by GC-MS and presented in chapter four. Twenty compounds representing 94.6% of essential oil of flowers of *Pogostemon paniculatus* were characterized; *cis*-β-farnacene and farnacene epoxide were found to be the major components. In the essential oil of *Hyptis capitata* 46 compounds representing 66.0% of the oil were identified and the major compounds were oct-1-en-3-ol and linalol. The essential oil of *H.capitata* also noted by the presence of hydroquinone.

The fifth chapter consists of two sections. In the first section the essential oil analysis of *Litsea laevigata* (LL) and its fractions are included. Twenty six compounds representing 99.2% of the oil were identified in the essential oil sample LL of which monoterpenes were the major class of compounds (59.3%). The major compounds were α-pinene, β-pinene, α-terpineol, fenchol, limonene and 1,8-cineole. The percentage of sesquitertpene was about 37.4 % were as nonterpenoid compounds constitute
only 2.5%. The important sesquiterpenes are trans-α-bergamotene, α-copaene and β-santalene.

The second section consists of the anti-microbial study of the *Litsea laevigata* essential oil and its fractions. The essential oil exhibited concentration dependent activity. The oil is very active against gram-positive bacteria such as Streptococcus albus and fungi such as Aspergillus niger. The essential oil fractions LLP and LLD were less active against all microorganisms when compared with the original essential oil. This shows a synergic action of molecules in anti-microbial activity. The polar fraction which contains more oxygenated compounds showed slightly higher antimicrobial activity than the nonpolar fraction. This observation is well known. The minimum inhibitory concentration is low for gram positive bacteria such as *Staphylococcus albus* and gram negative bacteria such as *Escherichia coli*. The two fungi *Candida albicans* and *Aspergillus niger* also showed lower MIC. The antimicrobial activity exhibited by the oil is fairly good even though it does not contain phenolics. The attractive odour of this essential oil along with its promising anti-microbial property makes it a valuable material for a possible therapeutic use.