CONCLUSION

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The chemical investigation of plants has been a favourite area of research around the globe as well as in India for several decades. Kerala is blessed with a wide variety of plants whose biological activity are still unknown. Studies conducted on local plant wealth are very limited, but there is ample scope in this field so as to expose biological activity of plant products and their applications in different fields such as medicine, agriculture, etc. Therefore, the aim of this research work was to identify and separate, medicinally and commercially useful essential oil constituents of different plants by GC, GC-MS, GC-MS-O techniques.

The work presented in this thesis comprises of the analyses of essential oils from five plants. Among the five essential oils extracted studies were conducted upon the antibacterial properties of three of the essential oils. One of the essential oils was fractionated by column chromatography and by distillation. All the five fractions thus obtained were investigated for their constituents and antibacterial property. Antifungal property of one of the essential oils was also researched upon.

More than two hundred known compounds were identified in these various essential oils and their fractions. Findings of olfactory evaluation of the essential oils gave valuable contributions to perfumery. Some of the odour notes can be of use in after shave lotions and personal health products.
Analysis of the essential oil of leaves of *Cinnamomum zeylanicum* is given in Chapter 1. Gas Chromatographic Analysis and the combined Gas Chromatography Mass Spectrometry (GC, GC-MS) analysis led to the identification of thirty nine compounds and a high percentage (85.7) of linalool was obtained. Based on this work a paper entitled "Analysis of *Cinnamomum zeylanicum* Blume Leaf Oil from south India" has been published in the Journal of Essential Oil Research (J. essent. Oil Res., 13, 2001, 442).

Chapter 2 exposes the seasonal changes in the composition and olfactoric properties of *Syzygium travancoricum* essential oil. The essential oil from the leaves collected during the month of June was analysed by GC, GC-MS and forty five compounds were identified. By noting the major components present in the essential oils, various medical and commercial applications are also identified. This work has been published as "Analysis of the Essential Oils of the Fresh Leaves of *Syzygium cumini* and *Syzygium travancoricum* from South India" in the Journal of Essential Oil Bearing Plants (J.E.O.P., 2, 1999, 68). *Syzygium travancoricum* is a rare plant and little studies were conducted on this plant earlier. Essential leaf oil from *Syzygium travancoricum* plants collected during the month of April was analysed by GC-FID, GC-MS and GC-O methods. The essential leaf oil content obtained from this species was higher than that of the species collected in the month of June. The aroma was also a little intense in the latter. The difference in essential oil content may be due to seasonal variations. This work has been
published under the title "Analysis of the Composition and Aroma of the Essential Leaf Oil of *Syzygium travancoricum* from South India by GC-FID, GC-MS and Olfactometry: Seasonal Changes of Composition" in the Journal Chromatographia (Chromatographia 53, 2001, S-372).

Chapter 3 consists of analysis of the essential oil of the aerial parts of *Aristolochia indica*. GC-FID, GC-MS and Olfactoric methods were used to identify fifty six compounds. This work has been published as a paper entitled "Analysis of the Essential Oil of the Aerial Parts of the Medicinal Plant *Aristolochia indica* Linn. (Aristolochiaceae) from South India" in the Journal Scientia Pharmazeutica (Sci. Pharm.) 68, 2000, 309.

Chapter 4 presents the analysis of the essential oil volatiles of *Leucas indica* using GC-MS and olfactometry resulting in the identification of ninety three compounds. The head space of this *Leucas indica* was trapped using Solid Phase Micro Extraction (SPME) and analysed by means of GC-FID. The head space analysis threw more light upon the aroma compounds responsible for the characteristic odour of the essential oil. Correlation of compounds and corresponding aroma impression in accordance with published data also gave valuable information.

This work has been published as a book chapter entitled "Analysis of the Essential Oil Volatiles of *Leucas indica* from South India" (Recent Res. Devel.
Analysis of the essential oil of the fresh leaves of *Syzygium cumini* and the findings thereof are discussed in Chapter 5. By GC and GC-MS techniques, sixty-four compounds were identified. A paper has been published on this work in the *Journal of Essential Oil Bearing Plants* and the title is "Analysis of the Essential Oils of the Fresh Leaves of *Syzygium cumini* and *Syzygium travancoricum* from South India" (J.E.O.P., 2, 1999, 68).

Chapter 6 deals with the antimicrobial studies of various essential oils extracted. It also contains the study of separated fractions of one of the essential oils.

Antibacterial activity of *Syzygium cumini* and *Syzygium travancoricum* leaf essential oils was studied against three gram positive and three gram negative bacteria. It was found that *Syzygium cumini* essential oil was more antibacterial than *Syzygium travancoricum*. A short report on "Antibacterial activity of *Syzygium cumini* and *Syzygium travancoricum* Leaf Essential Oils" has been accepted for publication in the *Journal Fitoterapia*. Antibacterial activity of *Aristolochia indica* essential oil also showed moderate activity against the same type of bacteria under similar conditions. A short report on "Antibacterial Activity of the Essential Oil
from *Aristolochia indica* has been accepted for publication in the journal *Fitoterapia*.

Since *Syzygium cumini* essential oil was found to be more antibacterial, it was subjected to further studies. The antifungal activity of the same was evaluated and found to be active against the five fungi tested. *Syzygium cumini* essential oil was separated into five fractions by column chromatography and by distillation and their antibacterial activity was also investigated. These five fractions were analysed using GC, GC-MS techniques and identified one hundred and two compounds.