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**CHEMICAL AND MICROBIOLOGICAL
STUDIES ON SOME MEDICINAL PLANTS
IN SRI LANKA**

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**Thesis submitted for the Degree of Master of Philosophy in Chemistry to the
Faculty of Science of the University of Kelaniya, Kelaniya, Sri Lanka.**

March 1997

ABSTRACT

Chemical studies on six medicinal plants of Sri Lanka namely *Kaempferia galanga*, *Hibiscus abelmoschus*, *Piper longum*, *Anamirta cocculus*, *Berberis aristata* and *Coscinium fenestratum* are reported in this thesis. Antimicrobial studies on *K. galanga*, *H. abelmoschus*, *P. longum* and *A. cocculus* were carried out.

The variation in the volatile oil contents in the rhizome and root of *Kaempferia galanga* (Zingiberaceae) with maturity as well as the percentage of the constituents present in each of these oils were determined by GC. The one year old rhizomes and two years old roots gave the highest yields of oil. The plants cultivated under coconut trees showed a higher rhizome oil content and lower root oil content than those grown in the open area. Major compounds of this oil were identified as ethyl cinnamate and ethyl p-methoxycinnamate. In rhizome oil the percentage of ethyl p-methoxycinnamate decreased with maturity while the percentage of ethyl cinnamate increased. In root oil the percentages of both compounds increased with maturity. Microbiological studies of this oil indicated that both these oils have shows antibacterial and antifungal activities.

GC-MS studies showed that farnesyl acetate was the major compound in the seed oil of *Hibiscus abelmoschus* (Malvaceae) grown in Sri Lanka. Previously unreported 2,3-dihydrofarnasene was identified by GC-MS from the oil. Although the seed oil showed antibacterial activity, it didn't show any antifungal activity.

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The piperine content in various parts of *Piper longum* (Piperaceae) plant, and its variation with maturity in the berries were studied by HPLC analysis. The results of this study shows piperine content in the local berries was lower than that reported for those from India. Further it was found that not only the berries but also roots, stems and leaves of local plant contain considerable amount of piperine. This study also indicates that the local berries gave the highest piperine content at the age of 2 months and the plants cultivated under coconut trees have higher piperine content than those from the open cultivation. GC-MS analysis of the essential oil of *P.longum* showed that it contained at least 76 compounds .Of these twenty were identified by mass spectral data.. The compounds identified were α -pinene, β -pinene, limonene, 1-ethenyl-4-methoxybenzene,4-methyl-1-(1-methylethyl)-3-cyclohexen-1-ol,linalyl propanoate,3,7-dimethyl-2,6-octadien-1-ol,2-undecanone,eugenol, 1-ethenyl -1-methyl-2,4-bis (1-methylethyl)cyclohexane, caryophyllene, 7,11-dimethyl-3-methylene-1,6,10-dodecatiene,1,1,4,8-tetramethyl-4,7,10-cycloundecatriene, 3,7,11-trimethyl-1,6,10-dodecatrien-3-ol,caryophyllene oxide, methyl eicosonate, 8-heptadecene, tetradecanal, methyl hexadecanoate, hexadecanoic acid. The oil also showed marked antibacterial activity.

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Cosciniium fenestratum (Menispermaceae) is the plant which serves as the source of berberine in Sri Lanka in place of *Berberis aristata* (Berberidaceae) which is very rare in Sri Lanka but common in India. Berberine content in the two plants were determined by HPLC. This study indicates that *C. fenestraum* has a higher berberine content than *B. aristata* found in Sri Lanka. Berberine content in the stem bark of commercial samples of *C. fenestraum* purchased from the markets in Pettah was higher than those grown in

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Sri Lanka. Tetrahydroberberine was characterised from the alkaloid fraction of *C. fenestratum*.

Total alkaloid content in the leaves of *A. cocculus* (Menispermaceae) was higher than in the stems. The triterpenoid 21- β -moretenone was characterised from the stem and leaf extracts of *A. cocculus*. This is the first report of this compound from *A. cocculus*. Microbiological studies carried out on the stem and leaf extracts of *A. cocculus* showed that both extracts showed antibacterial activity but no antifungal activity