ALLELOPATHIC ACTIVITY STUDIES OF SRI LANKAN FLORA AND CHEMICAL INVESTIGATION OF ENDOPHYTIC FUNGI AND TERRESTRIAL *STREPTOMYCES* SPECIES

A THESIS PRESENTED

BY

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to the Board of Study in Chemical Sciences of the

POSTGRADUATE INSTITUTE OF SCIENCE

in partial fulfillment of the requirement

for the award of the degree of

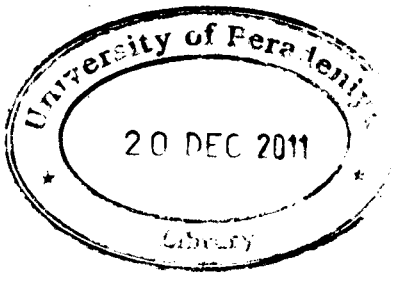
DOCTOR OF PHILOSOPHY

of the

UNIVERSITY OF PERADENIYA

SRI LANKA

2011



ALLELOPATHIC ACTIVITY STUDIES OF SRI LANKAN FLORA AND CHEMICAL INVESTIGATION OF ENDOPHYTIC FUNGI AND TERRESTRIAL *STREPTOMYCES* SPECIES

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The first part of the present investigation is focused on the search for the allelopathic active compounds from Sri Lankan plants, with the hope of using them as herbicides. In order to trace allelopathic activity, seed germination inhibition bioassay was employed, using lettuce (*Lactuca sativa)* and barnyard grass (*Echinochloa crus-gall*) seeds. Out of 60 plant extracts tested, 14 plant extracts significantly reduced radicle growth of lettuce seeds and barnyard grass seeds. Considering preliminary activity results, the ariel parts of *Mikania scandens* and the bark of *Canarium zeylanicum* were selected for further chemical and biological investigation, with the aim of isolating allelochemicals, which are responsible for the above activity. Activity guided fractionation of the *M. scandens* extract led to the isolation of highly active compound mikanolide which showed lettuce seed inhibition activity at MIC 25.0 μg/mL. Activity guided fractionation of the *C. zeylanicum* bark extract led to the isolation of two compounds 13-hydroxy-12-methoxy-8,11,13-podocarpatrien-3-one and 3β-OAc,28-COOH acetyl aleuritolic acid. As *M. scandens* is a highly abundant invasive plant in Sri Lanka, either this plant in crude form or as mikanolide in pure form could be developed as an environmental friendly herbicides in Sri Lanka.

The second part of the present study was focused on chemical investigation of endophytic microorganisms, especially fungi and terrestrial *Streptomyces*, with the aim of isolating biologically active compounds. In this process, isolated fungi were cultivated, extracted, and tested for biological activities. According to the chemical and biological screening nine endophytic fungal strains and three terrestrial *Streptomyces* strains were selected for further

chemical investigation. From these strains, seventy compounds were isolated using chromatographic techniques. Of them seven compounds were found to be new. They are hydroxy-2-isocyanatebenzoic acid, 2-isocyanate-3-methoxy-benzoic acid, 5,6-dimethyl-2, 3-dihydro-phthalazine-1,4-dione, tectariamide, 1,3,5,7-tetraaza-tricyclo[6.6.1.0*4,15*]pentade ca-2,4 (15),5,7-tetraene, 2-phenyl-2H-pyrazolo[3,4-d] pyrimidine and N-(chloro-1, 3, 4, 5, 6-pentahydroxyl-hexyl)acetamide. Structural elucidation of the new compounds and other isolates were carried out with the help spectroscopic analysis, x-ray analysis, comparison with literature data and the help of AntiBase data base.

Antibacterial activity of above compounds was tested against five control strains *E. coli* (ATCC25922), *Pseudomonas aeruginosa* (ATCC27853), *Enterococci faecalis* (ATCC 29212), *Bacillus subtilis* (ATCC6051), *Streptomyces viridochromogenes* (Tü 57) and *Staphylococcus aureus* (ATCC29213) using a disk diffusion method (40 μg/disk). Of them, cercosporamide, beauvericin and altertoxin I showed the highest activity against *Bacillus subtilis* and *E. coli.* Antifungal activity of isolates were tested against strains of human pathogenic fungus *Candida albicans* and plant pathogenic fungi *Rhizoctonia solani* and *Pythium ultimum*, using disk diffusion method. Glaucanic acid and beauvericin showed the highest activity against *Candida albicans.* Algaecide activity of isolates was tested against strains of three microalgae; *Chlorella vulgaris*, *Chlorella sorokiniana*, and *Scenedesmus subspicatus* were used in this study. Of them, only julichrome Q_3,3 showed activity against *Chlorella vulgaris*.