

C
540
PUN

CHEMISTRY OF SOME ANNONACEAE PLANTS

A THESIS PRESENTED BY

SHANMUGAM PUVANENDRAN

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*

MASTER OF PHILOSOPHY

PERMANENT REFERENCE
FOR USE IN THE
LIBRARY ONLY

of the

UNIVERSITY OF PERADENIYA

SRI LANKA

2008

627064



ABSTRACT

CHEMISTRY OF SOME ANNONACEAE PLANTS

S. Puvanendran

Department of Chemistry

Faculty of Science

University of Peradeniya

Peradeniya

Sri Lanka

This thesis describes the chemistry and biological activities of *Xylopi* *championii* Hook. f. & Thoms and *X. parvifolia* (Wight) Hook. f. & Thoms, antioxidant and mosquito larvicidal activities of some endemic Annonaceae plants, and antifeedant activity of *Goniothalamus gardneri* Hook. f. & Thoms.

The first section deals with the antioxidant and antifungal activities of alkaloids and terpenoid isolated from *X. championii*. Seven alkaloids, *O*-methylmoschatoline (9), (-)-discretine (97), (+)-laudanine (100), oxopurpureine (160), demethyl-10 xylopinine (161), nordicentrine (162), dehydrocorytenchine (163) were isolated. The alkaloids (+)-laudanine (100) and (-)-discretine (97) showed potent antioxidant activity in the DPPH assay. (-)-Discretine (97) and nordicentrine (162) showed potent antifungal activity against the fungus *Cladosporium cladosporioides*. In addition, a terpenoid, *ent*-kaur-16-en-19-oic acid (23) isolated from *X. championii* showed moderate antifungal activity and weak antioxidant activity. However, it showed a good activity against the second instar larvae of *Aedes aegypti* (L.). None of the isolated pure alkaloids showed a positive response in the mosquito larvicidal assay against the second instar larvae of *A. aegypti*. Interestingly these alkaloids seem to be stimulating the growth of the larvae when compared to the control. Another terpenoid, 15 β -hydroxy-(-)-kaur-16-en-19-oic acid (77) along with *ent*-kaur-16-en-19-oic acid (23), *O*-methylmoschatoline (9), (-)-discretine (97), (+)-laudanine (100), oxopurpureine (160), nordicentrine (162), dehydrocorytenchine (163) was isolated from the stem bark of *X. parvifolia*.

The next section deals with the antioxidant and mosquito larvicidal activities of some endemic Annonaceae plants namely, *Alphonsea hortensis* H. Huber, *Desmos*

zeylanica Hook. f. & Thoms., *Enicosanthum acuminata* (Thw.) Airy-Shaw, *Goniothalamus hookeri* Thw., *G. salicina* Hook. f. & Thoms., *Phoenicanthus coriacea* (Thw.) H. Huber, *Uvaria semecarpifolia* Hook. f. & Thoms., *U. sphenocarpa* Hook. f. & Thoms., *Xylopiya championii* Hook. f. & Thoms. and *X. nigricans* Hook. f. & Thoms. The results obtained from the DPPH assay revealed that some of the extracts had superior ability to neutralize free radicals. For example, the MeOH extract of stem of *A. hortensis* (56.30 %), MeOH extract of leaves of *U. semecarpifolia* (57.33 %), CH₂Cl₂ and MeOH extracts of stem bark of *X. championii* (67.05 % and 79.03 %, respectively), MeOH extracts of leaves of *G. salicina* (59.98 %), and MeOH extract of seeds of *X. nigricans* (62.06 %) showed high radical scavenging activity compared to the standard DL- α tocopherol (55.84 %). In the mosquito larvicidal assay, the CH₂Cl₂ and MeOH extracts of *G. hookeri* demonstrated high larvicidal activity (LC₅₀ = 1.9 and 2.1 ppm, respectively) while its leaves exhibited even higher activity (LC₅₀ = 0.4 ppm). The CH₂Cl₂ extracts of stem of *A. hortensis* and leaves of *E. acuminata* (LC₅₀ = 46.9 and 41.5 ppm, respectively) and the MeOH extracts of seeds of *D. zeylanica* and bark of *A. hortensis* (LC₅₀ = 44.6 ppm and 46.9 ppm, respectively) showed significant activity. The most active was the CH₂Cl₂ extract of leaves of *G. hookeri* with an LC₅₀ value of 0.4 ppm.

The latter part of the study describes the antifeedant activity of two acetogenins **164** and **165** isolated from *G. gardneri* Hook. f. & Thoms. Both **164** and **165** showed potent antifeedant activity against the second instar larvae of *Plutella xylostella* (L.).

The results obtained from this study revealed that the family Annonaceae is a good source of antioxidants and larvicides.