

**ANTIOXIDANT, ANTIMICROBIAL AND ANTI-INFLAMMATORY ACTIVITIES OF
*CRYPTOCARYA RUGULOSA***



**RESEARCH MANAGEMENT INSTITUTE (RMI)
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR
MALAYSIA**

BY :

KHONG HENG YEN

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1. Letter of Report Submission

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Assistant Vice Chancellor (Research)
Research Management Institute (RMI)
Universiti Teknologi MARA
40450 Shah Alam

Dear Professor

FINAL RESEARCH REPORT "ANTIOXIDANT, ANTIMICROBIAL AND ANTI-INFLAMMATORY ACTIVITIES OF *Cryptocarya rugulosa*"

With reference to the above, I am pleased to submit three copies of the Final Research Report entitled "Antioxidant, Antimicrobial and Anti-Inflammatory Activities of *Cryptocarya rugulosa*".

Thank you.

Yours faithfully

KHONG HENG YEN
Leader
Research Project

5. Report

5.1 Proposed Executive Summary

There are several potential Malaysian *Cryptocarya* species which have ethnobotanical uses but little studies have been carried out to link these folkloric uses with the phytochemistry of these plant species. Previous studies have revealed *Cryptocarya* genus is a rich source of secondary metabolites such as flavonoids, pyrones, lignans, terpenoids, alkaloids and steroids, of which 2-pyrones and flavonoids are the common secondary metabolites for this genus. The findings also showed that the types of secondary metabolites isolated are based on the geographical location. It would be interesting therefore, to identify the chemical constituents of *Cryptocarya rugulosa* from Sarawak. Some species of *Cryptocarya* have been shown to possess interesting biological activities such as antitumor, anti-inflammatory, antibacterial, antiviral and antifungal activities. Root samples of *Cryptocarya rugulosa* will be extracted and purified using standard protocols which involves the conventional extraction technique such as chromatographic methods. Analyses for structural elucidations of pure bioactive compounds will involve the usual spectroscopic techniques such as NMR, FTIR, UV and GCMS. The isolation and identifications of these natural products will lead us to establish a chemical and biological profile of the extract for product development. The outcome of this project is a document of medicinal plants rich in active compounds for further investigation for potential in drug development.

5.2 Enhanced Executive Summary

Previous studies have revealed *Cryptocarya* genus is a rich source of secondary metabolites such as flavonoids, pyrones, lignans, terpenoids, alkaloids and steroids, of which 2-pyrones and flavonoids are the common secondary metabolites for this genus. The findings also showed that the types of secondary metabolites isolated are based on the geographical location. Thus, this study is aimed to identify the chemical constituents of *Cryptocarya rugulosa* from Sarawak and to determine their antioxidant, antimicrobial and anti-inflammatory activities.

Roots part of *C. rugulosa* was extracted and purified using standard protocols of the conventional extraction technique such as chromatographic methods. Analyses for structural elucidation of pure compounds were determined using the modern spectroscopic techniques including NMR, FTIR, UV and GCMS.

A detailed study on the roots of *C. rugulosa* has resulted in the isolation of few pure compounds. However, the amount of the pure compounds were too little to run the complete analysis for the structure elucidation, except one coumarin: 6,7,8-trimethoxycoumarin. In addition, the tested methanolic root extracts of *C. rugulosa* exhibited high antioxidant activity with IC_{50} of 94.92% and 98.27% in DPPH and XOD superoxide scavenging assays respectively. Furthermore, it has also demonstrated very high tyrosinase inhibitory activity with IC_{50} of 94.6% inhibition. Besides, all methanolic extracts of *C. rugulosa* from the leaf, bark and root resulted strong inhibition ($< 14 \mu\text{g/mL}$) against the test bacteria, such as *Staphylococcus aureus*, *Streptococcus pyogenes*, *Clostridium difficile* (Gram-positive bacteria) and *Pseudomonas aeruginosa* (Gram-negative bacteria). However, *C. rugulosa* showed a moderate inhibition of enzyme activity with 54.62 % in lipoxygenase assays and low anti-gout properties with 37.51 % inhibition.

The present findings constituted additional evidence of the occurrence of coumarin in this genus. Thus the presence of **1** could be of chemotaxonomic significance to the genus *Cryptocarya* in particular, and also to the family Lauraceae.

The findings indicated that this strong active extract from *C. rugulosa* has the great potential to be developed as natural whitening agent in the nutraceutical and cosmetic products.