

**ANTI-INFLAMMATORY, ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF**  
*Artocarpus odoratissimus*



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## 5. Report

### 5.1 Proposed Executive Summary

Some *Artocarpus* species are used as traditional medicines. Based on previous studies, there is a close connection between traditional and modern sources for ethnopharmacological uses of *Artocarpus* species, especially for treatment against inflammation, malarial fever, diarrhoea, diabetes and tapeworm infection. For example, in Sarawak, *Artocarpus odoratissimus* is used by local communities to treat diarrhoea and as an antidote against centipede and scorpion stings. It is also used to treat scabies. Previous chemical studies done on *Artocarpus* species have also revealed that *Artocarpus* species are rich in phenolic compounds, including flavonoids, stilbenoids, arylbenzofurans and Jacalin, a lectin. Despite all these, chemical profile of the indigenous plants from Sarawak, such as *Artocarpus odoratissimus* has not been studied intensively and the analyses of medicinal properties have not been explored. It is pertinent therefore, to develop a chemical profile of one such Sarawakian species, *Artocarpus odoratissimus*, a species not reported before. This research aims to isolate all the bioactive compounds in *Artocarpus odoratissimus* and to determine their biological activities.

The leaves samples of *Artocarpus odoratissimus* will be extracted and purified using standard protocols which involves extraction technique such as chromatographic methods. Analyses for structural elucidations of pure bioactive compounds will involve the spectroscopic techniques such as NMR, FTIR, UV and MS.

The findings will provide a documentation of active compounds for further investigation in its potential in drug development. In addition, it also will provide useful information for biotechnology research and development based on government National Biotechnology Policy and National Economic Key Areas (NKEA) to develop herbal products derived from local plants and herbs. Besides that, the outcome of this research could provide the chemical profile for extract standardization and fingerprinting which will benefit manufacturers in development of herbal products.

## 5.2 Enhanced Executive Summary

*Artocarpus* genus belongs to *Moraceae* family. The genus *Artocarpus* comprises of approximately 50 species and is widely distributed in tropical and subtropical regions. There are several local Malaysian *Artocarpus* species which have ethnobotanical uses but so far little studies have been carried out to link these folkloric uses with the phytochemistry of these plant species. It would be interesting therefore, to develop a phytochemical data of *Artocarpus odoratissimus*, a species not reported before. Thus, this study aims to isolate, identify the chemical constituents from *Artocarpus odoratissimus* extracts, as well as to determine the anti-inflammatory, antioxidant and antimicrobial activities.

The leaves and barks of *A. odoratissimus* were cut, air-dried and grounded before macerated in hexane, ethyl acetate and methanol to yield the methanol, ethyl acetate and hexane crude extracts. Four compounds were elucidated and identified using spectroscopic techniques which include NMR, FTIR, UV and MS; and compared with the previous reported data.

In the antioxidant activity using (2,2-diphenyl-1-(2,4,6-trinitrophenyl) hydrazyl (DPPH) assay,  $IC_{50}$  was used in this antioxidant assay to detect at which concentration for the studied samples has the 50% inhibition of lipid peroxidation. The presence of antioxidant in the sample leads to the disappearance of DPPH radical chromogens. It can be detected spectrophotometrically at 517 nm.

In the two assays of anti-inflammatory, in Lipoxygenase Assay, the result showed a high inhibition of enzyme activity with 86.5 % inhibition for the barks methanol extracts and a moderate enzyme activity with 62.54 % inhibition for the leaves methanol extracts. Moreover, in Xanthine Oxidase Assay, the bark extracts exhibited moderate anti-gout properties with 59.5 % inhibition and low inhibition for the leaves extracts. In addition, a good antimicrobial activity exhibited from the MIC and MBC assay for the crude extracts. The findings indicated that *Artocarpus odoratissimus* are potential natural source of biological activities agent and worthwhile to expand the study.



### 5.3 Introduction

Natural products are a renewable source of chemicals and are derived from living things such as plants, microbes and animals. Multidisciplinary approach which consists of botany, ethnobotany, phytochemistry and biological techniques are often involved in the study of natural products. Recently, the use of natural products as nutraceuticals for improving human health has become popular. According to The World Health Organization, more than 80% of the world population in developing countries depends primarily on plant based medicines for basic healthcare needs (Canter et al., 2005). The forest in Borneo (Malaysia), which located in Southeast Asia, is rich with its natural biodiversity. The bioresources are known to be important sources of bioactive components with health, nutritional and pharmacological properties. However, not all of the plants in our forest have been studied and explored.

Generally the genus *Artocarpus* is appreciable importance as a source of edible fruit. For instance, the fruit pulp of *A. heterophyllus* is tasty and sweet, thus it is used as a dessert or even preserved in syrup. Whereas, immature fruits are usually used as vegetables. Besides, the leaves are used as food wrappers in cooking and the flowers are used as food in salads or can be cooked (Tang et al., 2013)

Local *Artocarpus* species are used as traditional medicines to treat inflammation, malarial fever, diarrhea, diabetes and tapeworm infection, as well as to treat scabies. For example, *Artocarpus odoratissimus* is used by Iban communities in Sarawak to treat diarrhea and an antidote against centipede and scorpion stings (Chai, 2006).

The chemical profile of the indigenous plants from Sarawak, such as *Artocarpus odoratissimus* has not been studied intensively and the analyses of medicinal properties have not been explored. It would be interesting therefore, to develop a chemical profile of one such Sarawakian species, *Artocarpus odoratissimus*, a species not reported before. Thus, it would be an interesting study on this species of indigenous tropical plant of Sarawak in order to develop a new chemical profile not only for the purpose of expanding knowledge but also as an alternative for medicinal purpose to cure diseases.