

**Cytotoxic properties of selected *Etlingera* spp. and *Zingiber* spp.
(Zingiberaceae) endemic to Borneo**

Abstract

Zingiberaceae are known as valuable herbs with an important role in the prevention and treatment of various diseases. More than 300 species of Zingiberaceae were documented in Borneo. In this study, methanolic extracts of three species of Zingiberaceae (namely, *Etlingera velutina*, *Etlingera belalongensis* and *Zingiber vinosum*) were analysed for their total phenolic and flavonoid contents and cytotoxic activity in vitro. The cytotoxic activities of these extracts were tested against several cancer cell lines, such as hormone dependent breast cancer (MCF-7), non-hormone dependent cancer (MDA-MB-231), ovarian cancer (CaOV 3) and cervical cancer (Hela) using MTT assay. Crude extracts from rhizome of *E. belalongensis* and *E. velutina* showed significant cytotoxic activity against MDA-MB-231 cell line proliferation, with IC₅₀ values (concentration which inhibit 50% of cell population) of 51.00±4.24 µg/ml and 67.00±9.89 µg/ml, respectively. The methanol extracts were further analysed for the cell cycle analysis using flow cytometry. The results showed that the *Etlingera* species exhibited higher antioxidant activity and stronger cytotoxic activity in selected cancer cell lines, with the highest cell death accumulated in G1 phase as compared to *Zingiber* species. Thus, polyphenol phytochemicals could be the major contributors to the cytotoxic activity of these species. As a conclusion, tropical gingers in Borneo investigated in this study have the potential to be developed as anticancer remedies.