

## CHAPTER 5

### CONCLUSION

In the present study, the crude and fractionated extracts of the leaves, rhizomes, roots and pseudo stems of *Alpinia scabra* were tested for cytotoxic activity against MCF7, SKOV-3 and MRC-5 cell lines using MTT assay and based on the outcome of the study, the hexane and chloroform extracts of *A. scabra* leaves showed high inhibitory effect against the MCF7 cells whilst the hexane and chloroform extracts of leaves and chloroform extracts of rhizomes displayed very good cytotoxic effect against SKOV-3 cells. It was observed that the hexane and chloroform fractions generally demonstrated stronger bioactivities than the crude methanol extracts. This was probably due to the increase in concentration of active chemical components in the fractionated extracts.

In this study, bioassay-guided fractionation was used to isolate the compounds from the active fractions. Ten enriched fractions (LC1 - LC10) were yielded after purification of the leaf chloroform extract. Among the ten fractions, only fraction LC4 which showed excellent cytotoxic activity was further purified and resulted in 17 sub-fractions (VLC1 - VLC17). Sub-fraction VLC9 showed excellent cytotoxicity against MCF7 and SKOV-3 cells but not toxic against normal MRC-5 cells. Meanwhile, eighteen fractions (RC1- RC18) were obtained after purification of the rhizome chloroform extract, by which fraction RC5 showed cytotoxicity against SKOV-3 cells with high selectivity index. The leaf hexane fraction was found to contain, methyl palmitate and methyl stearate and since these compounds were reported to display strong cytotoxic effect in a previous study by Sri Nurestri *et al.* (2009), it is highly

probable that the cytotoxic activity may have been contributed by the fatty methyl esters.

Besides that, there were marked morphological changes when observed using phase-contrast inverted microscope, DAPI nuclear staining and also presence of DNA fragmentations in MCF7 and SKOV-3 cells after treatment with the cytotoxic extracts and fractions which were indicative of cell apoptosis. Further investigations in order to understand the interaction mechanism involved in the cytotoxic and apoptotic effect of these extracts and fractions can be carried out.

In conclusion, the current study suggests that the chloroform extract of leaf and rhizome may be a potential source of cancer chemopreventive agent. The compounds present in the leaf sub-fraction VLC9 and the rhizome fraction RC5 responsible for the cytotoxic activity was not investigated. Thus, further studies on the isolation of pure compound(s) and chemical characterization of the cytotoxically active compounds are necessary. It appears that unrelated medicinal use of the source plants may serve as an initial guide in selection of plants for cytotoxicity screening. Plants derived natural products hold great promise for drug discovery and development of new pharmaceuticals. Hence, the potential growth inhibitory activity of the *A. scabra* extracts and fractions should be taken into account when considering further development and prioritization as a cancer chemotherapeutic agent, either alone or in combination with other anticancer agents.