

Chapter 5

Conclusions

- In this study, investigation of microfungi occurrences in 14 soil samples yielded relatively low diversity with a total of 26 filamentous fungi and 1 yeast species. More isolates were from Deception Island as 13 species out of 5 samples, followed by Wilhelmina bay with 8 species out of 4 samples, then Yankee bay with 6 species of 5 soil samples.
- Twenty seven fungal species were representing three different taxa in which 10 species were Ascomycota, 4 Zygomycota and 13 undetermined fungi species. Of them, only one fungus was completely identified (*Aspergillus fumigatus*) and 3 species were partially identified (*Geomyces* sp. and two *Mucor* sp.) and 23 unidentified species.
- This study recorded the abundance of psychrophiles (15 species) followed by psychrotolerant fungi (12 species). There is no occurrence of thermophiles fungi within volcanic soil of Deception Island.
- In the preliminary screening of antimicrobial activity, 18 fungal species (over 60%) of the screened species exhibited antibacterial potential, with an equal number of active species between Gram positive and Gram negative bacteria. Nevertheless, there was no antifungal activity among the test isolates. Plug assay were found to be good and fast method for qualitative study of antimicrobial activity.

- Disc diffusion method reported only four fungal species with weak to moderate antibacterial activity and one species (*Hyphomycetes* sp.8) with moderate to excellent broad spectrum antimicrobial properties. The powerless of metabolite extraction method has significantly reduced the number of biologically active species when disc diffusion method applied. Though, the activity of some fungi has been increased when disc diffusion method applied.
- Comparing the spectrum and inhibition zone diameter of the chemically synthesized antibiotic (Chloramphenicol) with fungal crude extract; Chloramphenicol has widest spectrum among the bacterial strains compared to the narrow spectrum of the majority of fungal extracts. Chloramphenicol illustrates the largest diameters of inhibition zones compared to the extract of Antarctic fungi. In contrast, Chloramphenicol exhibits no antifungal activity on the test yeast pathogens, whilst extract of *Hyphomycetes* sp.8 do.
- Quantification assays showed generally varied MICs values among the test microorganisms from 0.78 - 12.5mg/ml. However, low MICs values found to do not correlate to high activity on disc diffusion assay. This study also showed the relatively low lethal dose of fungal extracts, since 50% of MBCs values were observed to have the same values of MIC. Similarly, MFC of *Hyphomycetes* sp.8 showed the same MIC value against *Saccharomyces cerevisiae*.