

Antimicrobial activities of Antarctic soil microbes from Deception island

Yong Sheau Ting¹ and Clemente Michael Wong Vui Ling¹

¹*Biotechnology Research Institute, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia*

Deception island is a member of the South Shetland islands in Antarctica. Being the largest volcano in the region, active volcanic eruptions in Deception island have altered the landscape and created remarkably unique environments compared to other parts of Antarctica (Ibáñez *et al.*, 2003), which resulted in the development of highly diverse microbial communities. A wide range of exceptionally rare microbial species has been reported in this island, but few studies have been conducted on the antimicrobial activities of the soil microbes. Therefore, this study aimed to determine the antimicrobial activities of the soil microbes from Deception island. A total of 90 isolates were obtained, which were clustered into 30 groups at a similarity of 60% using random amplified polymorphic DNA fingerprinting (RAPD) fingerprinting technique. The isolates were subjected to antimicrobial testing against 14 foodborne pathogens such as *Salmonella spp.*, *Klebsiella pneumonia*, *Enterobacter cloacae*, *Bacillus cereus*, *Vibrio parahaemolyticus* and *Escherichia coli*. Isolates A60, Im31, Im32 and Im33 were able to inhibit the growth of 8, 5, 8 and 14 pathogens. They were also found to be psychrotolerant and were able to grow at 4°C. Sequencing of 16S rDNA or internal transcribed spacer (ITS) regions of these 4 isolates revealed their identities as *Pseudogymnoascus*, *Bacillus*, *Leohumicola* and *Talaromyces spp.* *Talaromyces* strain Im33, which inhibited all foodborne pathogens, was found to be a new fungal species which is resistant to cycloheximide. Carbon utilization test showed that *Talaromyces* strain Im33 possesses a variety of enzymes which breaks down arabinose, fructose, galactose, glucose, inositol, mannitol, mannose, raffinose, sorbitol, sucrose and xylose. The findings of this study suggested that fungi dominated the soil microbial communities in Deception island, which most probably due to their abilities to withstand the cold, as well as to produce a wide range of enzymes and antimicrobial compounds.

References

Ibáñez, J.M., Almendros, J., Carmona, E., Martínez-Arévalo, C. and Abril, M., The recent seismo-volcanic activity at Deception island volcano, Deep-Sea Research II, 50 (2003), 1611-1629, 2003.