MICROBES IN BIOTECHNOLOGICAL APPLICATIONS

This book explains the various microbes that may potentially be used for different applications in biotechnology. This book first presents the moderately halothermophilic organism strain RA previously isolated from a hot spring on Langkawi Island. This new strain was characterized and identified as a novel species belonging to the family of Rhodothermaceae. The next chapter presents the isolation of bacteriophages from soil which are specific to B. subtilis. The preliminary observation suggests it has the potential to be used as a component in biofertilizer. Chapter 3 highlights a study on probiotics is currently gaining popularity among researchers. The study isolated a Lactobacillus sp. from a Malaysian fermented food using specific primers Lacto-16S- F/R. Probiotic microorganisms i.e. Lactobacillus sp. can aid in the improvement of microbial flora in the human intestine. The following chapter explores the isolation of a lipase-producing microorganism, Arthrobacter sp. from the Antarctic continent. The second final chapter investigates the isolation of Aspergillus sp., an Ascomycetes fungi and Mycelia sterilia in samples of traditional medicine sold in stores and markets. The order of microbial prevalence in such samples possibly due to improper storage are as follows: Genus Aspergillus followed by Ascomycetes fungi and Mycelia sterilia. Therefore, consumption of such contaminated traditional medicine may impart potential health risks to the consumers, especially those with compromised immune systems. The final chapter described fungal species can cause dehalogenation of β-substituted compounds of 3-chloropropionic acids (3CP). This is the first study on reductive dehalogenation of β-haloalkanoic acid as it was not observed in the previously reported bacterial degradation of 3CP.

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Degradation of 3-Chloropropionic Acid by Locally Isolated *Trichoderma asperellum* Strain SD1

Shanmugaprakasham Selvamani, Mohamed Faraj Edbeib, Azmeer Azzar Abdul Hamid and Fahrul Zaman Huyop

6.1 INTRODUCTION

Wide uses of halogenated compounds have led to accumulation of toxic and persistence xenobiotic compounds in nature. Exposures to xenobiotics, especially chlorinated compounds are the most carcinogenic and difficult to remove (Field and Sierra-Alvarez, 2004). Exposure of xenobiotics also can lead to cancers and tumour growth with risk of pancreatic and breast cancers (Cohn *et al.*, 2007).

Microorganisms have been identified with ability of utilizing these halogenated compounds. Dehalogenation is a process of bioremediation where the halogenated organic compounds can be degraded biologically by enzymatic activity (Husaini *et al.* 2008). Microbial degradation of α-chloro substituted compounds is well established but dehalogenation of β-substituted compounds especially 3-chloropropionic acids (3CP) is far from clear (Kurihara *et al.* 2008). A small group of bacteria such as such as *Rhodococcus* sp. (Jing and Huyop, 2007), *Pseudomonas* sp. (Mesri *et al.*, 2009), and *Bacillus* sp. (Lin *et al.*, 2011) were reported with the β-dehalogenases properties.