

UNIVERSITI TEKNOLOGI MARA

**MICROALGAE SELECTION FOR PROSPECTIVE
ANTIOXIDANT COMPOUND PRODUCTION BY
DPPH ASSAY**

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Microalgae are the candidate of producing natural antioxidant that can be used in biopharmaceutical application such as anticancer, antibacterial, and many more. Therefore, further study was conducted in Microalgae Research Laboratory (MRL), Faculty of Pharmacy UiTM Puncak Alam in order to detect the antioxidant properties in the microalgae. In order to extract the antioxidants that exist within the microalgae, the method of extraction suggested by Mannan et al. (2010) was used in this study. The microalgae species used are still unknown but are marked according to their original location. Those microalgae were Ku Lom 2 X₂ and Z5. The extraction method used is known as solvent extraction with hexane, ethyl acetate and 80°C deionised water as the solvents with 30 minutes of extraction time at room temperature. The antioxidant capacity was analysed by using DPPH assay. At the end of this study, there were negative percentage scavenging activity of DPPH. This leads to a few speculations on what factors that contribute to absence of antioxidant activity in the microalgae strains. The factors may arise during steps of production of MDEs. One of the steps is during microalgae culturing which involve the abiotic factor such as nitrogen concentration, incident light intensity, temperature variation and others. The stressors that are given to the microalgae will cause it to produce more secondary metabolites and thus, higher amount of antioxidants. During microalgae extraction, types of solvents, extraction time and temperature and also solvent-to-solid ratio is very crucial in extracting maximum amount of antioxidant from the microalgae cell. Therefore, extraction methods needs to be revised for determination of antioxidants in microalgae.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Nowadays, oxidative stress is a major cause of inflammatory issues that results in a great number of diseases, such as cancers, neurodegenerative, cardiovascular diseases and diabetes (Li, Horke, & Förstermann, 2014; Wang et al., 2014). An antioxidant is a substance that, when present in low concentrations compared to that of an oxidisable substrate, it significantly delays or inhibits the oxidation of the substrate (Halliwell & Gutteridge, 1995). Today, mostly synthetic antioxidants, such as butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA), tert-butyl-hydroquinone (TBHQ) or propyl galate (PG) are used in pharmaceutical industry (Borsato et al., 2014). These compounds are preferable because of their chemical stability, low cost and availability. However, most of these compounds are speculated to be the promoters of carcinogenesis (Amlashi, Hadjmohammadi, & Nazari, 2014). The aromatic compounds of these chemicals can release free radicals which can induce cancer and tumors. Thus, efforts have to be made to find natural source of antioxidants to replace those synthetic antioxidant.

Microalgae are microscopic algae which usually found in freshwater, brackish water and marine systems. They are important organism on earth because they possess different types of biologically active molecules associated with their potential use such as anticancer (Kosanić, Ranković, Stanojković, Rančić, & Manojlović, 2014), antimicrobial