UNIVERSITI TEKNOLOGI MARA

DEVELOPMENT OF RAPID PCR FOR THE IDENTIFICATION OF MALAYSIAN MICROALGAE ISOLATES

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TABLE OF CONTENT

ABSTRACT

Microalgae has been widely known as a natural sources of highly potential of bioactive compounds that are valuable in many factors such as food, cosmetics and even biopharmaceutical application. Previous research found out that microalgae has beneficial properties that make this species useful in the pharmaceutical product such antioxidant, antimicrobial and anticancer properties. However, current methodologies for microalgae identification are very laborious and time-consuming. The requirement of many reagents and steps involved in the microalgae identification leads to a large investment of money needed; the researchers are more susceptible to chemical exposure and lead to a very time-consuming process. These factors cause microalgae identifications are very challenging which concurrently influence the utilization of microalgae. Rapid and simple methods for microalgae identification that are able to eliminate these challenges are in demand. New rapid methods are derived in this study by eliminating the reagents involved in the conventional method. Rapid Method 1 requires addition of Tris-EDTA with physical mean while Rapid Method 2 requires physical mean only for DNA extraction. The conventional PROMEGA method is included in this study to allow comparison to be made between conventional method and rapid method. Three samples of microalgae were subjected with different parameters of microalgae identification to identify the most effective method for microalgae identification. Rapid Method 2 shows the bright amplification band similar to the conventional PROMEGA kit which indicated these methods is able to yield the PCR product. However, Rapid Method 1 did not show any amplification band which is not suitable for the microalgae identification. This finding helps in the development of new rapid and simple method in the microalgae identification. Thus, promote microalgae research thus utilization of microalgae for their benefits is increasing.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Microalgae are microscopic algae, unicellular species and that are typically found in aquatic systems. They play a vital role in the aquatic environment as a primary producer and contribute to global atmospheric carbon dioxide acquisition. Microalgae produced natural sources of fatty acids, carotenoids, antioxidants, and enzymes (Brennan & Owende, 2013). These make microalgae valuable for the commercial production of feed, food, food additive, pharmaceutical product and fine chemicals (Ebenezer, Medlin, & Ki, 2012).

Microalgae are incredibly diverse microorganism. There are approximately 200,000–800,000 species exist, of which only about 35,000 are described currently (Cheng & Ogden, 2011). Therefore, a large number of untapped reserves of microalgae are still waiting to be isolated, identified and screened for their ability to produce specific bioactive metabolites which worth for their application in broad ranges of pharmaceutical related industry. Thus, the development of method that is reliable and rapid for microalgae identification is required to facilitate the above screening process.