

UNIVERSITI TEKNOLOGI MARA

**OPTIMIZATION OF A
CRYOPRESERVATION PROTOCOL
FOR A MALAYSIAN FRESH WATER
MICROALGAL, *Chlorella vulgaris***

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Dissertation submitted in partial fulfillment
of the requirements for the degree of
Master of Science

Faculty of Applied Sciences

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CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 26th January 2015 to conduct the final examination of Nor Afiqah binti Anua on her Master of Science dissertation entitled “Optimization of a Cryopreservation Protocol for a Malaysian Fresh Water Microalgal, *Chlorella vulgaris*” in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the students be awarded the relevant degree. The Panel of Examiners was as follows :

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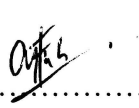
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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This dissertation has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Microalgae is important in many biotechnological exploitations in producing valuable products, services and processes. Many microalgal strains are able to grow post cryopreservation because the technology of cryopreservation has improved tremendously over the years. Cryopreservation is a process whereby the cells or the whole tissue are preserved by cooling to an ultralow temperature of -196°C such that it remains capable of growth upon thawing. In this study, *Chlorella vulgaris* was used to determine the viability post cryopreservation at different concentrations of cryoprotectant employing three different protocols. Dimethyl sulfoxide (DMSO) at different concentrations of 0%, 10%, 20% and 30% were added to the microalgal suspension in the research. Protocol 1 involves direct plunging into liquid nitrogen, Protocol 2 is slow cooling to -80°C and Protocol 3 is slow cooling to -20°C . The absorbance value at 540 nm was used as a measurement to determine the growth post cryopreservation. The absorbance value recorded with 30% DMSO in Protocol 2 showed the highest at 0.387 ± 0.015 and was significant at $p < 0.05$ compared to Protocol 1 and 3. The best protocol for the optimization of the cryopreservation of *C. vulgaris* was Protocol 2 using slow cooling to -80°C treated with 30% DMSO as the cryoprotective agent.

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