

UNIVERSITI TEKNOLOGI MARA

**STUDIES ON DIATOMS BIOSILICA
ISOLATION AND PURIFICATION**

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ABSTRACT

Diatoms are a major group of microalgae known for their unique siliceous cell wall called frustules. Diatoms biosilica are widely investigated and applied in multi-disciplines due to micro- to nano-sized porous structure of the frustules and biocompatibility. Reports on applications of diatoms biosilica are abundant in biotechnology, yet the standard protocol on extracting and purifying the biosilica are still scarce. Therefore, this study aims to refine and assess the methods for diatoms biosilica extraction by using locally isolated marine diatoms. For this, marine diatoms were isolated from different spots in Pantai Remis, Kuala Selangor and their *in vitro* growth were adapted in Tris-phosphate seawater medium (TP-SW). PCR analysis with primers targeting 18S rDNA gene was performed to identify the species. Culture of diatoms were harvested at exponential growth phase and subjected to three biosilica extractions method which are Method A, Method B, and Method C. Assessment for the extracted diatoms biosilica was executed by scanning electron microscopy (SEM) examination. It was found that TP-SW can support the growth of marine diatoms though the medium has yet to be optimized for high biomass of wide range of diatoms. PCR analysis resulted in eight genera of diatoms from a total of ten samples. They were *Cylindrotheca*, *Thalassiosira*, *Amphora*, *Nitzschia*, *Minutocellus*, *Cocconeis*, *Navicula* and *Halamphora*. Based on SEM examination, all methods have revealed the morphological features of diatoms frustules. Method A produced the best quality of biosilica compared to Method B and Method C. Biosilica from Method A yielded the highest number of detached and intact frustules that are cleaned from debris and organic material. In conclusion, all three methods assessed in this study have provided useful information for future investigation on chemical and mechanical treatments involved to isolate and purify biosilica from local diatoms. Adaptation of diatoms from Pantai Remis in TP-SW medium has furnished the knowledge to develop an artificial medium for wide-range Malaysian diatoms species. The goal of establishing a standard method to obtain high quality biosilica from Malaysian diatoms is attainable with further research.

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