

# INTERNATIONAL SEMINAR AND WORKSHOP

MARINE BIODIVERSITY AND  
THEIR POTENTIAL FOR DEVELOPING  
BIO-PHARMACEUTICAL  
INDUSTRY IN INDONESIA

organized by :



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**CHARACTERITIC OF PROTEIN SILAFFIN - LIKE PROTEIN  
WHICH CATALYZE FORMATION SILICA STRUCTURE  
ISOLATED FROM INDONESIAN MARINE DIATOM  
*Chaetoceros gracilis***

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**ABSTRACT**

The utilizations of nanostructure such as silica play a vital role in various biomedical applications, in molecular imaging, biomarkers and biosensor for various analysis. Production of these materials usually requires harsh conditions (temperature, pressure, pH and chemicals). By contrast, the natural biosilica production is accomplished under mild physiological conditions. In biological system such as diatoms and sponges, the formation of solid silica structures with precisely controlled morphologies was directed by protein and polysaccharides and occurs in water at neutral pH and ambient temperature.

Indonesia is a maritim country with high diversity in its marine diatoms. *Chaetoceros gracilis* is one of marine diatom as potential sources of silaffin like proteins, which probably shows unique characteristic in their ability of catalyzing biosilification. The aims of this research were isolated and analyzed the activity of silaffin-like protein isolated from diatom *Chaetoceros gracilis*. The diatom cell collected by Research and Development Centre for Oceanology-LIPI and cultured in F2 medium containing silic acid. The culture harvested after seven days of incubation at room temperature and intensity of light at 3000 lux. Separation of cell wall diatom was conducted by SDS/EDTA solution, the protein was analyzed by Electrophoresis SDS-PAGE to estimate molecular weight, the protein concentrate was analyzed by Bradford method, and the activity of the protein was analyzed by tetraethoxysilane (TEOS) as substrated. The result studied that the growth rate of *Chaetoceros gracilis* was very high. The yield of frustules (cell wall) from culture was 0.34 % or 64 µg/g sample. SDS-PAGE showed four bands of 44.65, 42.18, 23.88 and 12.07 kDa. Concentration of the protein was 1.20 mg/ml and activity of the protein by TEOS showed the highest polymerization reaction was incubated at 24 hours, which polymerized 239.74 µmol/ml TEOS monomer.

*Keywords: biosilica, ,Chaetoceros gracilis, polymerization, protein silaffin*