

# 2012 한국생물공학회 춘계학술발표대회 & 국제심포지움

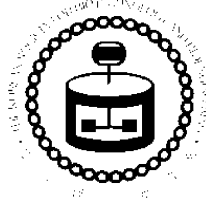
## 2012 KSBB SPRING MEETING & INTERNATIONAL SYMPOSIUM

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창원 컨벤션센터

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Changwon Exhibition Convention Center



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• 준비위원회 •

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### 학술

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위 원: 김용성 교수 (아주대)  
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최선욱 교수 (경남대)  
최병대 교수 (경상대)

### 재무

위원장: 이제현 대표 (다인바이오)  
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주최 : 한국생물공학회

**PMB05 Effects of Temperature and Solvents on the Stability of Algicidal Agent Prodigiosin**

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To develop prodigiosin as biological control agent against *Chattonella antiqua*, a harmful alga that can cause red tides, selection of an organic solvent for prodigiosin extraction from culture broth and a test to determine the stability of prodigiosin were performed. Prodigiosin was extracted using nine solvents, and extracts were analyzed by LC-MS. Acetone was selected as the best organic solvent because of its high extraction efficiency and less process time. Stability tests for prodigiosin were performed at various temperatures, and algicidal activity against *C. antiqua* was also tested. Ultimately, more than 98% stability was sustained after 30 days at 4°C, and less than 30% stability was maintained after 30 days at 37°C. More than 5~14% of the algicidal activity of prodigiosin extracted with acetone was sustained at each temperature, when compared with the prodigiosin extracted with ethanol. Although prodigiosin was kept for 30 days in an optimum organic solvent, the stability of prodigiosin was safely maintained and algicidal activity was sustained at low temperatures such as 4°C. Considering these results, we know that acetone was a very useful extraction agent for the extraction of prodigiosin as a biological control agent.

Keywords : Prodigiosin , Algicidal activity , Red tide

**PMB07 Study the Growth of Marine Diatom *Navicula* sp in Natural Sea Water in Laboratory Conditions.**

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Diatoms are single celled algae that make silica shells (frustules) with nanoscale features imbedded within two-dimensional pore arrays. Living diatom itself metabolically insert nano-structured titanium dioxide into its surface. *Navicula* sp. (#1271) from Korean culture bank (KMMCC) was cultured in natural sea water supplemented with f/2 nutrient s in the photo bioreactor. In stage I, diatom cells grown up on dissolved silicon until silicon starvation was achieved. In stage II, soluble titanium and silicon were continuously fed to the silicon starved cell suspension ( $10^5$  cells /ml) for 10 hrs. The feeding rate of titanium was designed to circumvent the precipitation of titanate in the liquid medium, and feeding rate of silicon was designed to sustain one cell division. The addition of titanium to the culture had no detrimental effect on the cell growth and preserved the frustule morphology. Intact frustule was prepared from harvest and analyzed for titanium using SEM, TEM, EDS and XRD analysis.

Keywords : diatom , frustule , phytoplankton , cell culture , TiO<sub>2</sub>

**PMB06 Exo-type alginate lyase from a newly isolated marine bacterium *Sphingomonas* sp. MJ-3**

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A marine bacterium possessing alginate-degrading activity was isolated from brown seaweed soup liquefied by salted and fermented anchovy, previously. The bacterium was designated to *Sphingomonas* sp. Strain MJ-3 based on 16S-23S ITS region sequences, biochemical characteristics and cellular fatty acid composition analysis. A novel alginate lyase gene was overexpressed in *E. coli* BL21 (DE3). The MJ-3 alginate lyase protein shared below 27.0% sequence identity with exolytic alginate lyase, A1-IV of *Sphingomonas* sp. A1. The time-dependent degradation of alginate by MJ-3 alginate lyase was analyzed by high-field <sup>1</sup>H nuclear magnetic resonance (NMR) spectroscopy, using an ECX-NMR 400Hz JEOL spectrometer (JEOL, USA). Based on the results of FPLC, TLC and NMR, the recombinant MJ-3 alginate lyase is determined to be an exolytic alginate lyase that can degrade the alginate into alginate monosaccharides. Acknowledgement : This work was supported by New & Renewable Energy R&D program(20093020090020) and Korea Institute for Advancement in Technology (KIAT) through the Workforce Development Program in Strategic Technology under the Korea Ministry of Knowledge Economy(MKE).

Keywords : Exolytic lyase , *Sphingomonas* sp. MJ-3 , heparinase-like protein , alginate monosaccharides

**PMB08 Enhanced Production of Heteropolysaccharide-7 by *Beijerinckia indica* HS-2001 from Sucrose Using Response Surface Methodology**

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Heteropolysaccharide-7 (PS-7) is a possible alternative to xanthan or gellan due to its properties and potential applications. Sucrose was developed as a carbon source for production of PS-7 by *Beijerinckia indica* HS-2001 to overcome catabolite repression against glucose. The optimal carbon source and inoculum size for the production of PS-7 by *B. indica* HS-2001 were found to be sucrose and 5.0% (v/v). The optimal agitation speed and aeration rate for cell growth of *B. indica* HS-2001 were 495 rpm and 1.8 vvm using response surface methodology (RSM), whereas those for the production of PS-7 were 440 rpm and 1.2 vvm. The optimal inner pressure for cell growth of *B. indica* HS-2001 in a 100 L bioreactor was 0.02 MPa, whereas that for the production of PS-7 was 0.04 MPa. The production of PS-7 by *B. indica* HS-2001 from 30.0 g/L sucrose with an optimized inner pressure was 10.20 g/L, which was 1.32 times higher than that without inner pressure in a 100 L bioreactor. The maximal production of PS-7 under optimal conditions was 1.55 times higher than that before optimization.

Keywords : Heteropolysaccharide-7 , *Beijerinckia indica* HS-2001 , Response Surface Method