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Immobilization of β -agarase from *Agarivorans sp.* JA-1

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In this study, we describe the properties and immobilization of β -agarase from *Agarivorans sp.* JA-1 isolated from north-eastern sea of Jeju island. The strain was cultivated in 300 mL flask with shaking incubator at 30°C, 250 rpm and the culture broth was centrifuged to obtain clear supernatant which was used for all assay. Optimal cell growth were defined that the medium containing agar concentrations of 0.2%. The decreasing pattern of viscosity and agar concentration was same and they reached almost zero after 15 hours. In particularly, fed-batch culture was studied to improve agarase productivity by *Agarivorans sp.* JA-1 in marine broth containing 2.0 g/L agar with intermittent addition of 0.8 g agar two times. The hydrolysis products were identified oligosaccharide of degrees of polymerization 6. And then, Immobilization procedure briefly enzyme solutions were added in Na-alginate solution (20 mL, 3%). This homogeneity mixture were dropped into 0.1 M CaCl₂ solution. As a result of this procedure, β -agarase was entrapped in Ca-alginate spherical beads. The immobilized enzymes were washed twice with distilled water. Ca-alginate beads were stored in TAPS buffer (pH 7.8) solution until use.

Key word : Agar, β -agarase, *Agarivorans sp.* JA-1, alginate, immobilization

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Anti-Methicillin Resistant *Staphylococcus aureus* seaweed extracts
in marine algae, *Ulva lactuca*

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Our investigation of the seaweed extracts, *Ulva lactuca*. The biological activities antioxidant, antimicrobial activities, antifungal and hemolytic activity of ethyl-ether fractions and ethyl-acetate fractions from the seaweed, *U. lactuca* were investigated. *In vitro* antimicrobial screening of *U. lactuca*, against gram positive bacteria, gram negative bacteria and fungus. They were separately extracted using ethyl-ether and ethyl-acetate from dried samples at room temperature and freeze dried. Seaweed extracts were found to cause significant free radical scavenging effects on DPPH (1,1-diphenyl-2-picrylhydrazyl). Seaweed extracts had not significant hemolytic activity against RBC. Ethyl-ether extracts were the most exhibiting a broad-spectrum antimicrobial activity against each of the microbe tested. However, the *U.lactuca* extracts did not showed antifungal activity against *Candida albicans*. In particular, *U. lactuca* extracts showed strong activity against the bacterium MRSA (Methicillin-Resistant *Staphylococcus aureus*). And this is the first report on the antimicrobial activities of *U. lactuca* against MRSA. This result confirms the possible use of seaweed extracts as a sources of antimicrobial compounds or as a health-promoting food for aquaculture.

Keywords : *Ulva lactuca*, DPPH(1,1-diphenyl-2-picrylhydrazyl), MRSA(Methicillin-Resistant *Staphylococcus aureus*)