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Use Possibility as the Farm Flounder Feed Additive of the Mushroom Mycelium Extract Cultivated from the Natural Medium

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This study was carried out to investigate the antimicrobial and antioxidative effects of mycelium cultural extract from mushroom. Mushroom mycelium was grown in a defined synthetic liquid medium and citrus extracts, and the culture extracts were examined for antioxidant activity and antibacterial. Myceliums of *Phellinus linteus*, *Cordyceps militaris*, *Coriolus versicolor*, *Sparassic crispa*, *Agaricus blazei*, *Inonotus obliquus*, *Lentinus edodes*, *Hericium erinacium*, *Gonoderma lucidium* in 10% citrus extract supplemented medium and synthesis medium were incubated in a shaking incubator (120rpm, 24~30℃) for 7~15days. The antimicrobial activities of the culture fluid of mushroom mycelium grown in submerged liquid culture was tested against 12 microorganisms which were fish pathogens and common bacterial species. The culture extracts showed high activity against Vibrio sp and had poor effect on Streptococcus sp, S. parauberis, S. iniae. The culture extracts obtained from the synthetic medium showed 30~93% of the DPPH (1,1-diphenyl-2-picrylhydrazyl) radical scavenger activity, the culture extracts obtained from the citrus extracts medium exhibited antioxidant activity up to 55%.

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Hollow-fiber membrane reactor system development by recombinant *Escherichia coli* of a novel microsomal epoxide hydrolase from a marine fish, *Mugil cephalus*

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Enantiopure epoxides are important intermediates for producing enantiopure bioactive compounds. Epoxide hydrolases (EHs, EC 3.3.2.3) can be used for diverse chiral epoxides production instead of chemical synthesis. In this study, we cloned and characterized novel marine fish microsomal EH of *Mugil cephalus* based on bioinformatics. Multiple sequence alignment (MSA) of microsomal EH proteins and homology modelling with crystallographic template showed that marine fish mEH also has the catalytic triad, Asp^{238}, Glu^{417}, His^{444} and two tyrosine residues of Tyr^{312} and Tyr^{387} were conserved at the expected positions. When kinetic resolution was conducted by the recombinant EH, chiral (*S*)-enantiomer with a high enantiopurity of 99% *ee* and a yield of 15.4% was obtained from 50 mM racemic styrene oxide. And then, when a singler-stage hollow-fiber reactor system was performed by recombinant *E. coli*, chiral (*S*)-styrene oxide with a high enantiopurity of 99% from high concentration, 1 M substrate, for 12 hours.

Key words : Epoxide hydrolase, *Mugil cephalus*, multiple sequence alignment, hollow-fiber

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