Paramylon production by fed-batch cultivation of *Euglena gracilis* using waste in food industry [Poster]

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Euglena gracilis accumulates remarkable amount of beta-1,3-glucan, called paramylon, in the cells. It has been recently shown that the introduction of acyl chains into paramylon molecules gave thermoplasticity to paramylon. However, for the utilization of paramylon as a raw material of thermoplastics, development of an efficient mass production method of paramylon at a low cost is required. In the present study, the waste in food industry, such as waste beer, was utilized as cheap organic carbon source for the heterotrophic cultivation of *Euglena*. The heterotrophic cultivation of *Euglena* in the medium that yeast extract and vitamins B1 and B12 were added into waste beer gave a rapid growth and high density of *Euglena* cells same as that in the medium containing glucose as a sole carbon source. Moreover, fed-batch cultivation of *Euglena* using waste beer resulted in the efficient heterotrophic cultivation in quite high density. The *Euglena* cells that obtained by the fed-batch cultivation in high density were rich in paramylon and seemed to be suitable for raw material of thermoplastics. As a result, the fed-batch cultivation of *Euglena* using waste in food industry made an efficient paramylon production in high density and a practical production of valuables, such as bio-plastics, possible.

Study of Proteins that Catalyze Silica formation and Polyunsaturated Fatty Acid synthesis in Marine Diatom *Chaetoceros gracilis)*

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Silica polymers and polyunsaturated fatty acid (PUFA) are valuable substances due to their benefits for food and health industry. They are abundantly produced by diatom. The mechanism of their synthesis is controlled by several proteins. The aim of this research was to study the proteins involved in silica and PUFAs formation in *Chaetoceros gracilis*. Research methods include analysis of growth, cellular content of protein and lipid as well as fatty acid composition during growth. Protein characteristics were conducted by two-dimensional electrophoresis to estimate the molecular weight and isoelectric point. Proteins were identified by bioinformatic study. The cellular content of proteins, lipids and fatty acids were influenced by the growth phase. There were five silica proteins detected from silicaceous cell wall of this diatom. Silicic acid transport proteins which are active in the transport of silicic acid for silica synthesis was also identified during exponential to death growth phase. Eleven proteins involved in synthesis of PUFAs were identified, these included three microsomal desaturase proteins (Δ9 DES, Δ6 DES, ELO Δ6, prekursor ω-6 DES, prekursor ω-3 DES, spingolipid Δ8 DES, Δ12 DES, Δ4 DES, microsomal Δ4 DES, microsomal ω-6 DES and microsomal Δ6 DES).

Regulation of glycaemia with the application of recombinant CHH1 and its polyclonal antiserum in *Penaeus monodon*.

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Crustacean hyperglycaemic hormone (CHH) family neuropeptides have been in the research limelight for the past two decades due to their importance in the regulation of glycaemia, moulting and gonad development in crustaceans. Under natural conditions, the low levels of the CHH neuropeptide and the structural similarity of the three CHH family neuropeptides limit their purification directly from the animal. In this study, we carried out sequence analysis and homology modelling of CHH1 hormone gene, isolated the mature region of the CHH1 gene, constructed the recombinant translation expression vector (pET32a^{+}- PmCHH1) and produced the recombinant protein in *E.coli* (BL21 (DE3) pLysS). The translation expression vector construct (pET32a^{+}- PmCHH1) was successfully built for the production of recombinant CHH1 protein (rCHH1-29.47 kDa). rCHH1 produced a hyperglycaemic effect when experimentally injected into adult *Penaeus monodon* similar to that of the eyestalk extract. Polyclonal antibody (anti-rCHH1) was developed in mice for the purified recombinant CHH1 protein. A hypoglycaemic effect was induced by the polyclonal antiserum when injected into adult *P.monodon*, observed by 50% and 94.76 % reduction in glucose and CHH1 hormone level. Therefore, rCHH1 and its antibody could be useful tools to better understand the endocrine mechanisms regulating hyperglycaemia and reproduction in *P. monodon*.