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Cloning, Expression and Purification of 2-Keto-3-deoxygluconate Kinase from *S. marcescns*.

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The *kdgk* gene was amplified by PCR using *S. marcescns* genomic DNA as the template, with *Taq* polymerase. The *kdgk* gene was consisted of an ORF 933 nucleotides and encodes 311 amino acids with a deduced molecular weight of 34,210 Da. The *kdgk* fragment was inserted into pGEX-6P-1, and the ligation product was introduced into *E. coli* JM109. The resulting plasmid, pGEX-KDGK was re-transformed into *E. coli* BL21(DE3). When the optimal density at 600nm reached 0.6, 0.01mM IPTG was added to the cultures to induce the recombinant protein, and then cell growth was continued for 7h at 37℃. The molecular weight of the purified enzyme was estimated to be 32kDa using GSTrap FF affinity column chromatography, and the molecular mass of the denaturated enzyme by SDS-PAGE electrophoresis was approximately 32 kDa.

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Optimization of Growth Conditions and Exo-Polysaccharide Production of *Formitopisis pinicola* in Air-Bubble Bioreactor

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In the study, we proposed a logistic model($\mu=\mu_{max}(1-X/X_m)$) for mycelium growth and Leudecking-Piret model($dP/dt=\alpha \cdot dX/dt+\beta X$) for product(exo- polysaccharide) formation of *Formitopisis pinicola* in air-bubble bioreactor. The experiment have found the model parameters under the optimal conditions. Mycelium growth initially occurred without product formation but after some period the product began to appear while growth continued. The kinetic patterns were graphically illustrated.

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