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Biocatalytic asymmetric phosphorylation catalyzed by recombinant glycerate-2-kinase

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D-glycerate-2-phosphate is an important substrate and crucial metabolite of central carbon metabolism, glycolysis/gluconeogenesis and pentose phosphate pathway, glycine, serine and threonine metabolism, methane metabolism, biosynthesis of plant secondary metabolites, phenylpropanoids, terpenoids and steroids, alkaloids derived from shikimate pathway, antibiotics, amino acids. Therefore an efficient, robust and scalable route for the preparation of enantiopure D-glycerate-2-phosphate is needed. A straightforward one-step biocatalytic phosphorylation of glyceric acid catalyzed by a recombinant glycerate 2-kinase heterologously expressed as maltose binding protein fusion has been investigated using racemic and the enantiopure D- and L-glycerate as substrate. The reaction was coupled with the phosphoenolpyruvate/pyruvate-kinase-system for ATP-regeneration and monitored by ³¹P-NMR spectroscopy. This phosphorylation reaction using recombinant glycerate 2-kinase is highly enantio-selective and sustainable, as it yields enantiomerically pure D-glycerate-2-phosphate in less reaction steps and with higher purity than chemical routes.

Biography

Birhanu Mekuaninte Kinfu has completed his BSc at the University of Gondar in Applied Biology and his MSc in Biotechnology at Addis Ababa University. He has worked as University Lecturer for 2 years. Winning the prestigious DAAD Research Grant Award (German academic exchange service) under its 'young academics and scientists' program, he is currently pursuing PhD at Microbiology and Biotechnology Department, the University of Hamburg, Germany. His main work focuses on biocatalytic phosphorylation of selected metabolites, metagenomics and *in vitro* protein expression systems.

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