DETECTION AND AMPLIFICATION OF PUTATIVE HYDROGENASE 3 OPERON IN CITROBACTER SP. L17

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I would like to dedicate this thesis to my beloved people; my father, my mother, my sisters and brothers for their endless love, prayers and encouragement. Also not forgetting my father, mother and sisters in-law.

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ABSTRACT

Our ultimate dependence on fossil fuels will lead to dramatic depletion of these limited resources. Some developed countries have started to use renewable energy, which efficiently utilizes physical or environmental resources. Hydrogen has been expected to be the energy carrier of the future to replace fossil fuels. Hydrogen can currently be produced using many methods, most of which use fossil fuels. Biological hydrogen production is gaining wider interest now due to the cleaner production process. Hydrogenase is among the main enzymes involved in bacterial hydrogen production. Among the four types of hydrogenases reported, hydrogenase 3 is considered as the enzyme responsible for hydrogen production only. The others are involved in hydrogen production and utilization. In this research, *Citrobacter* sp. strain L17 was used. 15 genes in the putative hydrogenase 3 operon of this particular bacterial strain have been successfully detected and amplified. All the clustered genes have been predicted to be coded by 13,456 nucleotides. It has been predicted to be translated into 15 different proteins of 4,485 amino acids. EXPASY TRANSLATE was used to predict the amino acid sequence of the proteins coded by the hydrogenase 3 operon. The results of this study will guide future research of biohydrogen generation by *Citrobacter* sp. L17, in terms of maximizing biohydrogen yield via metabolic engineering.
ABSTRAK