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Expression of LM TK 1 and evaluation of its ability to activate nucleoside analogues in *E. coli*

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ABSTRACT

Thymidine kinase 1 is a central enzyme in synthesis of DNA precursors. In this study, Listeria monocytogenes thymidine kinase 1(LM TK1) gene was cloned into E. coli to determine the optimum conditions for expression and purification of LMTK1 enzyme. In addition, the enzyme's ability to activate some nucleoside analogues in bacteria and its effects on these bacteria were also assessed. E. coli BL21 (DE3) were transformed with pET expression vector carrying LM Tk1 gene. Expressed TK1 enzyme was purified using affinity chromatography with Nisepharose IMAC resin. The ability of the TK1 gene product for increasing susceptibility of Tk1-deficient E. coli toward nucleoside analogues was investigated. LM Tk1 gene cloning and expression in E. coli was successful. Results showed that the optimal induction time was at 4 hours. with specific activity of 307.668 u/mg. TK1 enzyme was readily purified and its molecular weight was 25 KDa. Tk1-deficient E. coli host showed variable sensitivity toward various nucleoside analogues.

Keywords: Listeria monocytogenes; Thymidine kinase 1; Cloning; Expression; Nucleoside analogues.