ABSTRACT FOR PARALLEL SESSIONS

S2-A03

Production Of Extracellular Thermostable Recombinant Phytase By *Escherichia Coli* B121 (DE3) When Glycerol As Carbon Source And Induced With Lactose

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Abstract

Phosphorus content in plants in the form of phytic acid (myo-inositol hexakisphosphate) is also known as phytate. It serves as a primary depository form of high-energy phosphoryl groups and several divalent cations.Phytase is a type of phosphatase enzyme that catalyzes the degradation of phytic acid and undigested organic phosphorus to be released as useable form of inorganic phosphorus. In this study, a recombinant *Escherichia coli* BL21 (DE3) which harbouringthermostablephytase gene from *Bacillus* sp.MD2.It'sknown that IPTG as inducer is toxic to the cells and costly.Therefore, lactose has been used as an alternative inducer in fermentation of recombinant *E.coli*. Unfortunately, lactose can be metabolized as carbon source and contribute to increase the metabolic overflow due to excess carbon sources during induction period which leads to acetic acid accumulation and lost of plasmid stability.To overcome this problem, the new synthetic glycerol minimal medium wasoptimized and formulated which enhanced leakage of phytase from periplasmic space to the extracellular medium. The extracellular phytase activity increased almost 88.22 % approximately 1.8-fold in optimized medium when compared to un-optimized medium with the total phytase productivity of 670.0 and 340.0 U L^{-1} hr^{-1}, respectively after 10 hours of post-induction phase.The used of glycerol as the carbon source for the cell growth increased excretion of phytase outside the cell membrane and expression of the phytase is the highest among other types of carbon source.The yield coefficient of total phytase activity was increased up to 102.92 % which was 13,076.92 U g^{-1} when statistically optimized induction strategy supplemented with glycine when compared with only lactose and $CaCl_2$. In conclusion, the increment of extracellular and total phytase activity was not showing drastically improved but the productivity of the total phytase production and extracellular phytase activity was increased up to 146.15 % and 119.9 %, respectivelywithin 6 hours of post-induction phase.

Keywords: Phytase, optimization, recombinant *E.coli*, lactose, extracellular activity.