The Construction of a Probiotic Lactic Acid Bacterium Expressing Acid-Resistant Phytase Enzyme

Authors : R. Majidzadeh Heravi, M. Sankian, H. Kermanshahi, M. R. Nassiri, A. Heravi Moussavi, S. A. Lari, A. R. Varasteh Abstract : The use of probiotics engineered to express specific enzymes has been the subject of considerable attention in poultry industry because of increased nutrient availability and reduced cost of enzyme supplementation. Phytase enzyme is commonly added to poultry feed to improve digestibility and availability of phosphorus from plant sources. To construct a probiotic with potential of phytate degradation, phytase gene (appA) from E. coli was cloned and transformed into two probiotic bacteria Lactobacillus salivarius and Lactococccus lactis. L. salivarous showed plasmid instability, unable to express the gene. The expression of appA gene in L. lactis was analyzed by detecting specific RNA and zymography assay. Phytase enzyme was isolated from cellular extracts of recombinant L. lactis, showing a 46 kDa band upon the SDS-PAGE analysis. Zymogram also confirmed the phytase activity of the 46 kDa band corresponding to the enzyme. An enzyme activity of 4.9U/ml was obtained in cell extracts of L. lactis. The growth of native and recombinant L. lactis was similar in the presence of two concentrations of ox bile.

Keywords : Lactobacillus salivarus, Lactococcuslactis, recombinant, phytase, poultry

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