

## **A Meat-Derived Lactic Acid Bacteria, *Lactobacillus plantarum* IIA, Expresses a Functional Parvulin-Like Protein with Unique Structural Property**

### **ABSTRACT**

The genome sequence of a Lactic Acid Bacterium (LAB) *Lactobacillus plantarum* IIA contains a single gene encoding a parvulin-like protein (Par-LpIIA). This protein belongs to Peptidyl Prolyl cis-trans Isomerase (PPIase) family proteins that catalyze a slow cis-trans isomerization of cis prolyl bond during protein folding. This study aims to provide molecular and biochemical evidences of the existence of Par-LpIIA in *L. plantarum* IIA and have an insight into its structural properties. The result showed that the gene encoding Par-LpIIA was successfully amplified using specific primers yielding a ~900 bp amplicon indicating that the gene indeed exists in its genomic DNA. BLAST analysis confirmed that the protein is a rotamase of parvulin-like protein. Further biochemical analysis demonstrated that cell lysate of *L. plantarum* IIA-1A5 exhibited remarkable PPIase activity towards peptide substrate and ability to accelerate the refolding of RNase T1, with the catalytic efficiency (kcat/KM) of 1.9 and 0.02  $\mu\text{M}^{-1} \text{s}^{-1}$ , respectively. A specific inhibitor clearly inhibited the PPIase activity for parvulin-like protein with IC50 of 230 nM confirming that the protein encoded by Par-LpIIA gene is a parvulin-like protein and expressed in an active form. Further, the three-dimensional model of Par-LpIIA showed that this protein consists of two domains of a homolog WW domain and PPIase domain with a unique active site configuration compared to human Pin1. Altogether, we then proposed the possible roles of this protein for *L. plantarum* IIA.