D-ribose isomerization using tagatose-6-phosphate isomerase from *Staphylococcus aureus*

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To investigate the substrate variety of a putative non-metal dependent isomerase, the tagatose-6-phosphate isomerase (E.C. 5.3.1.26) structural genes (*lacB*; 510bp and *lacA*; 430bp) of *Staphylococcus aureus* were subcloned and co-expressed. Based on the substrate configuration, various aldoses were surveyed for substrate of ketose isomerization. Among the 10 aldoses tested, D-ribose and D-allose were isomerized by the enzyme. The subunit A and B showed more than 95% activity for D-ribose and 75% for D-allose in the presence of 1mM EDTA compared with non-EDTA conditions, which implying tagatose-6-phosphate isomerase is a non-metal dependent isomerase. Each of subunit A or subunit B alone showed no activity for any of the substrates tested. The affinity constant (Km) of tagatose-6-phosphate isomerase against D-ribose and D-allose were 26 mM and 142 mM, respectively.

Key words: Tagatose-6-phosphate isomerase, *Staphylococcus aureus*, non-metal dependent isomerase, substrate variety, D-ribose, D-allose