

**Supplementary 1.** Phylogenetic analysis of 16S rRNA gene sequence similarities of *Enterobacter* sp. 3TP2A based on the BLAST result using the neighbor-joining method. Scale bar represents 0.1 substitutions per nucleotide position. The organisms and GeneBank accession numbers of analyzed sequences are given in parenthesis.

**Supplementary 2.** Some properties of β-galactosidases from bacterial sources.

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| --- | --- | --- | --- | --- |
| **Bacteria** | **Enzyme temperature** | **Enzyme pH** | **M.W kDa** | **Reference** |
| *Enterobacter* sp. 3TP2A  | 35 oC | 8.0-9.0 | 60 | The present study |
| *Bifidobacterium infantis* HL96 | 37 oC | - | 113 | Hung et al. 38 |
| *Enterobacter agglomerans* B1 | 37-40 oC | 7.5-8.0 | homodimer 248 | Lu et al. 16 |
| *Enterobacter cloacae* B5 | 35 °C |  6.5-10.5  | homotetramer 442  | Lu et al. 19 |
| *Streptococcus* *mitis*  | 30-40 oC | 6-6.5 | 268 | Campuzano et al. 20 |
| *Bacillus* sp*.* BPTK4 | 55 oC | 7.0 | 65 | Natarajan et al. 14 |
| *Bacillus subtilis* | 35 oC | 8.0 | 120 | El-kaderet al. 22 |
| *Lactobacillus* sp. | 37 oC | 7.2 | 116 | Sumathy et al. 23 |
| *Escherichia coli*  | 35 oC | 7.0 | - | Khedr et al. 35 |
| *Enterobacter cloacae* SJ 6 | 50 oC | 9.0 | 340 | Ghatak 37 |



**Supplementary 3a.** Effect of temperature on β-galactosidase activity in *Enterobacter* sp. 3TP2A



**Supplementary 3b.** Effect of pH on β-galactosidase activity in *Enterobacter* sp. 3TP2A



**Supplementary 4a.** Effect of thermal stability on purified β-galactosidase activity from *Enterobacter* sp.3TP2A



**Supplementary 4b.** Effect of pH stability on purified β-galactosidase activity from *Enterobacter* sp.3TP2A

**Supplementary 5.** Effect of metal ions on the activity of purified β-galactosidase from *E. cloacae*

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| --- | --- |
| **Chemicals**  | **Percent activity retained (%)** |
| **1 mM** | **2mM** | **5 mM** | **10 mM** | **20 mM** |
| Ca2+ | 94±2.3 | 95±1.5 | 100±1.5 | 105±1.0 | 84±2.1 |
| Cu2+ | 4.1±0.1 | 0 | 0 | 0 | 0 |
| Mg2+ | 117±1.5 | 125±2.3 | 120±0.3 | 120±1.5 | 147±2.3 |
| Zn2+ | 68±1.8 | 73±0.1 | 92±2.9 | 103±2.7 | ND |
| EDTA | 32±0.9 | 29±0.4 | 27±2.4 | 25±0.3 | 24±0.8 |

**ND:** Not determined

**Supplementary 6.** Effect of inhibitors on the activity of purified β-galactosidase

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| --- | --- |
| **Chemicals**  |  **Percent activity retained (%)**  |
| **1mM**  | **2mM**  | **4mM**  | **8mM**  |
| N-ethylmaleimide  | 0  |  0  |  0  |  0  |
| DTT  | 100±1.5  | 102±2.1  |  97±0.3  | 108±1.9  |
| β-Mercaptoethanol  | 102±1.2  | 99±1.4  |  ND  | 114±1.5  |
| Iodoacetamide | 99±3.02  | 87±4.3  |  94±1.4  |  93±1.7  |
|  | **0.2 mM**  | **0.4 mM**  | **1 mM**  | **2 mM**  |
| PCMB  | 13.7±0.4  | 13.9±0.5  | 13.08±0.8  | 13.3±0.2  |