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Xylose isomerase from *Actinoplanes missouriensis*: primary structure of the gene and the protein

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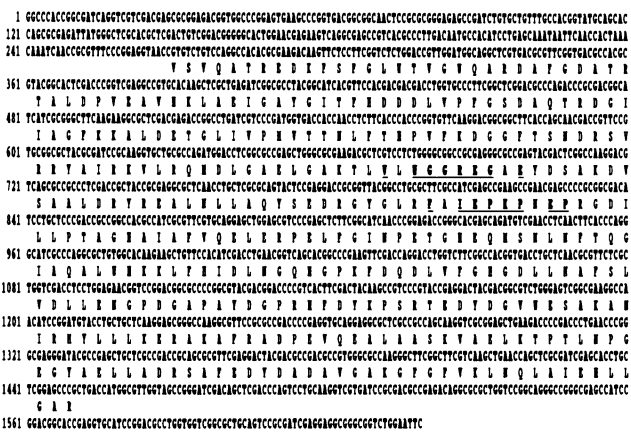
The gene encoding xylose isomerase (XI) from Actinoplanes missouriensis has been isolated by complementation of a xylose isomerase defective Escherichia coli strain (1). The expression of the xylose isomerase gene in Saccharomyces cerevisiae might be used to extend the substrate spectrum of this yeast and to enable the anaerobic fermentation of xylose.



The native XI has a molecular weight of 173,500 daltons and consists of 4 monomeric subunits. We have determined the nucleotide sequence of the gene and deduced the primary structure of the protein. The gene initiates with GTG and consists of a 1185 bp open reading frame which encodes a XI monomer of 394 amino acids and 43,500 daltons. The total GC content is 68%. 94% of the bases in the third wobble position of the codons are G and C.

The gene shows 74-92% homology with other xylose isomerase genes from Streptomycetes (2,3). The homology with Bacillus and E. coli isomerase genes is weak (4,5). However, two conserved regions are found at the protein level in all species examined so far. These regions are underlined in the sequence shown above and probably represent functional domains.

References

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