

Crystal Structure of *Mortierella vinacea* α -galactosidase I

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α -Galactosidase (E.C. 3.2.1.22) is an exoglycosidase that hydrolyzes an α -1,6-linked galactosyl residue from galacto-oligosaccharides and polymeric galacto-(gluco)mannans. α -Galactosidase I from *Mortierella vinacea* (α -Gal I) consists of 397 amino acid residues and it shows high activity to increase the yield of sucrose by eliminating raffinose, which prevents normal crystallization of beet sugar, and is sometimes referred to as raffinase. α -Gal I is considered to be a glycoprotein, resulting from the presence of its sugar chain. In addition, the gel filtration data shows that α -Gal I might exist as a tetramer in solution.

In order to understand the catalytic mechanism, we conducted structure analysis of this enzyme. Crystals of α -Gal I were obtained by the hanging drop vapour diffusion method using the polyethylene glycol 400 as a precipitant. Diffraction experiments were conducted at the Photon Factory, and the data up to 1.6 Å resolution were collected. Structure was determined by the molecular replacement method and the final model gave a crystallographic *R*-factor of 0.133 and an *R*_{free}-factor of 0.157. Owing to the high resolution X-ray data, four carbohydrate chains were observed in one α -Gal I molecule and their structures were identified to be high mannose type. α -Gal I seemed to form a tetramer around the crystallographic four-fold axis.

Keywords: α -galactosidase, glycoprotein, *Mortierella vinacea*