SL 202 **Fibrillar Multimers of Oat -Glucosidase Isoenzymes**

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-Glucosidases (EC 3.2.1.21) are widely distributed in prokaryotes and eukaryotes and known to be implicated in numerous biological processes, such as chemical defense against pathogens and herbivors. An oat -glucosidase hydrolyzes -glucosidic bond at C26 of avenacoside to yield 26-desglucoavenocoside which has an antifungal activity in oats. The enzyme is localized in oat plastid as unique structure so called stromacentres, a three dimensionally radiated arrangement of fibrillae, on electron microscopy.

Oat -glucosidase exists in two isomeric forms of homomultimer (type I) and heteromultimer (type II) which are made of two 60 kDa monomers of As-Glu 1 and As-Glu 2. The monomer forms a hexamer ring, which is in turn linearly assembled to form the long fibrillar multimers. The MW of the multimers increases upto several millions by stacking the hexamer ring with an integre number; [(hexamer)n, n=1, 2, 3, 4, 5, ----]. The type I enzyme is a homomultimers of the As-Glu 1 and the type II heteromultimers of the As-Glu 1 and As-Glu 2 in an 1:1 stoichiometry. The enzymes are exceptionally stable *in vitro* and the higher MW multimers have higher enzyme activity. The type I enzyme is more active than the type II.

The cDNA of the As-Glu 1 and As-Glu 2 were cloned and expressed in *E. coli* into soluble and active T7.Tag-fused mature proteins, separately and in combination of the two monomers. The T7.Tag-As-Glu 1 assembled to fibrillar homomultimers and the T7. Tag-As-Glu 1 and T7.Tag-As-Glu 2 assembled to fibrillar heteromultimers made of the two monomers in an 1:1 stoichiometry. However, the T7.Tag-As-Glu 2 formed mainly dimer but not the multimers. The results indicate that the As-Glu 1 monomer is required to assemble both the homomultimers and the heteromultimers.

The recombinant enzymes had very similar enzyme properties with the native enzymes. Since the fibrillar multimers of oat -glucosidase are exceptionally stable and their cDNAs are expressed to active and soluble enzymes, the expression system can be applicable to produce biologically active substances that are activated from biologically inactive precursors by the action of -glucosidases. Oat -glucosidase is a good model system to study the role of monomers for hexamer formation, the mode of assembly of hexamer ring to form the multimer and the long fibrillar miultimer structure as well as the function of the fibrillar multimeric enzyme