Crystal Structure Analysis of Maize Glutamine Synthetase

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Glutamine synthetase (GS; EC 6.3.1.2) in higher plants has important roles in the assimilation of inorganic nitrogen into glutamine. In plants, there are mainly two types of GS isozymes and they are localized in distinct subcellular compartments, namely the cytosol (GS1) and the plastids/chloroplasts (GS2). Ammonia from the soil and derived from the fixation of dinitrogen in leguminous bacteria is assimilated into glutamine by cytosolic GS1 in roots and nodules, respectively. In maize, five genes (*GS1a*, *GS1b*, *GS1c*, *GS1d* and *GS1e*) encoding cytosolic GSs are known [1]. Isozymes of cytosolic GS are subdivided into ammonia-induced (GS1a and GS1b) and noninduced (GS1c and GS1d) enzymes, which show distinct enzymatic and physicochemical properties.

In this study, we expressed the GS1a protein in *E. coli* cells and purified the protein for crystallization. Crystals suitable for X-ray analysis were obtained by the hanging drop vapor diffusion method. The crystals belong to space group P2₁with cell dimensions a=95.8 Å, b=191.0 Å, c=118.1 Å, β =101.5°. We are doing further analysis to obtain atomic resolution structure.

[1] Sakakibara H., Shimizu H., Hase T., Yamazaki Y., Takao T., Shimonishi Y., Sugiyama T., *J. Biol. Chem.*, 1996, **271**, 29561.

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