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Effective quality improvement of alpha-Amylase crystals under microgravity. Hiroaki Tanaka¹, Koji Inaka², Shigeru Sugiyama², Masaru Sato³, Sachiko Takahashi¹, Satoshi Sano³, Susumu Yoshitomi³, Hiroshi Komatsu⁴, ¹Japan Space Utilization Promotion Center, Tokyo 169-8624, Japan, ²Maruwa Food Industries, Inc., Nara 639-1123, Japan, ³Japan Aerospace Exploration Agency, Ibaraki 305-8505, Japan, ⁴Iwate Prefectural Univ., Iwate 020-0193, Japan.

Alpha-Amylase is a glycoprotein derived from *Aspergillus oryzae*. Crystals grown on the ground usually forms highly clustered morphology using PEG as a precipitant.

Crystallization was carried out by counter-diffusion method in the capillaries with the condition of 90 mg/ml alpha-Amylase, 40% (w/v) PEG 8000, 2mM CaCl₂, and 50mM Tris-HCl pH 7.5 at 20C. On the ground, highly clustered crystals appeared within 10 days, belonged to the space group P2₁2₁2₁ with unit cell parameters a=50.8, b=67.7, c=130.1Å, and diffracted to 1.12Å resolution. Under microgravity for 13 weeks in NASDA-GCF#1 mission in 2003, however, crystals were obtained as a single crystal which belonged to the space group P2₁2₁2₁ with unit cell parameters a=50.4, b=67.4, c=130.4Å, and diffracted to 0.89Å at SPring-8, BL12B2, which might be one of the highest resolution structures of a protein of such size. The statistics of the data processing indicated that the space-grown crystal was clearly superior to the ground-grown one at the same resolution.