3-Dimentional Reconstruction of Crystalline Inclusion Bodies in CAM Performing Species

InSun Kim*, Sung-Sik Han, Ji Young Mun, Kyung Eun Lee

**Department of Biology, Keimyung University, Daegu 704-701*

Graduate School of Life Sciences and Biotechnology, Korea University

High voltage electron microscopy (HVEM) and electron tomography have been applied to well-defined crystalline inclusion bodies detected in mesophyll chloroplasts of young Sedum leaves that perform crassulacean acid metabolism (CAM). CAM is a property of cells in photosynthetic leaf or stem tissue that has the ability of chloroplast-containing cells to engage in significant CO_2 assimilation in the dark, leading to the synthesis of C-4 malic acid.

The chloroplasts examined usually contained a large inclusion, up to ca. 7-8 ㎛, that were built up from tubular elements exhibiting aggregates of either large plate-like or paracrystalline lattice structures depending on the section angles. Approximately 0.25, 0.5, and 1 ㎛ thick sections were screened and stereo- and tilted images were obtained from the tilting ranging - 60° to + 60° at 2° interval. The inclusion bodies were quite irregular in shape, sometimes exhibiting branched patterns. Spatial relationship of the inclusion body with thylakoids and chloroplast inner envelope have been clearly shown that they were independent in the stroma. The role of these crystalline bodies in the chloroplasts related to photosynthetic mode will be discussed.

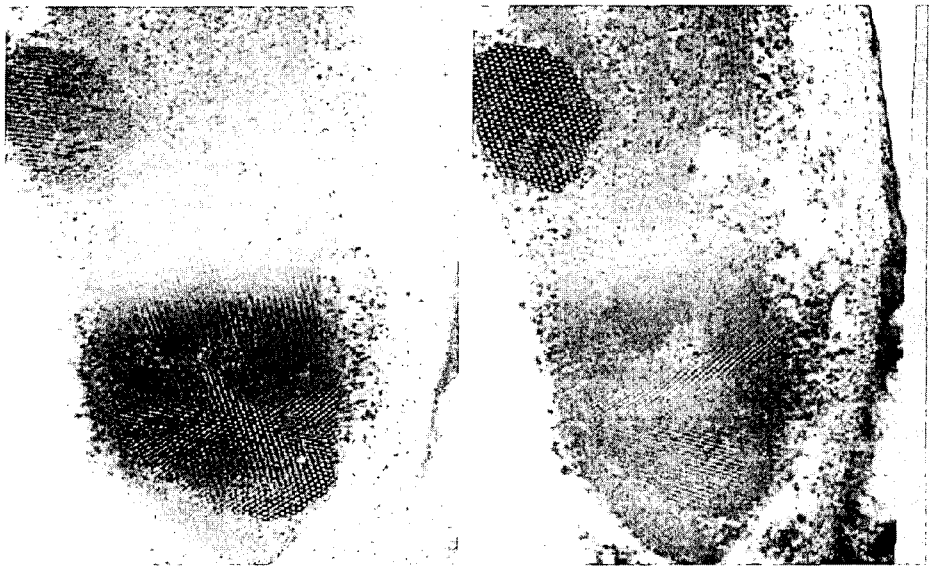

Figure 1. HVEM stereo image of the crystalline inclusion (Tilt angle ± 12°, 0.25㎛).