

**Experiment title:**

HIGH RESOLUTION STUDIES OF THE LIGHT HARVESTING
ANTENNA COMPLEX (LH2) FROM PHOTOSYNTHETIC
BACTERIA

**Experiment
number:**

LS 407

Beamline:

ID2-BL4

Date of Experiment:

from: 27/2/96

to: 28/2/96

Date of Report:

10/5/96

Shifts:

6

Local contact(s):

Ed. MITCHEL

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Report:

Data collections on crystals LH2 from *Rps. acidophila*, strain 10050 was attempted at both cryogenic (100K) and ambient temperatures. Despite many trials with various cryoprotectants at differing concentrations we were unable to improve the resolution of diffraction of the crystals at 100K beyond the limit of diffraction obtained elsewhere. These trials utilised about half our allocated beamtime. Data was then collected at room and cooled (4°C) temperatures on crystals grown in BOG and LDAO detergents respectively. (BOG has a phase transition about 10°C). Using the high intensity of this beamline and the small beam (100 x 100 μm) we were able to explore several sections of each LH2 crystal. In so doing we discovered that many, if not all, of the crystals we looked at (more than 20 in total) incorporated a salt crystal (NaCl) probably as a nucleation point at the very start of crystal growth. By selecting sections at the periphery of the crystal we were able to obtain diffractions beyond 2.3Å. This is a significant improvement on our existing maximum resolution. Although the diffraction resolution rapidly decreased below 2.5Å after 2-3° (5-6 images) we were often able to use another section of the same crystal to collect another 2-3° at this improved resolution. using multiple samples we were able to collect a data set which is 70% complete to 2.35Å.

At the ESRF we were able to use a high brilliance beam which has low divergence and small cross-sections without which we would not have proved the LH2 crystals appear seeded from NaCl, nor collected higher resolution data. We are convinced it is the presence of the salt crystal which makes cryocooling such a hazard. For our future experiments we will be seeding LH2 from the corners of crystals grown in the salt medium. Hopefully this will allow us to return with crystals which can be cryocooled and diffract to even better resolution.