# Evaluation of Biocrystallography Experimental Hutch of Hyogo Beamline (BL24XU)

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The branched experimental hutch A of Hyogo beamline (BL24XU) was constructed for ordinary crystal structure analysis of biological molecules. The monochromatized 1.5th harmonics from figure-8 undulator of BL24XU are introduced in the hutch. A conventional imaging plate diffractometer Rigaku R-AXIS4 was installed in the hutch.

To determine the linear polarization factor of incident X-ray, we carried out powder diffraction experiments on $\alpha$-$Fe_2O_3$ samples. Finally, the determined polarization factor is -0.54.

Sample protein crystals employed for the test were asprtate aminotransferase (AspAT) from *Phormidium lapideum*, Chitinase from *Matsuebactor chitosanotabidus*, and FMN binding protein from *Desulfovibrio vulgaris* Miyazaki F.

The crystals of AspAT belong to the tetragonal space group $P4_12_12$ with unit cell dimensions of $a$=$b$=133.4Å and $c$=125.8Å. Diffraction spots from an AspAT crystal were recorded at least up to 2.5Å resolution. For an AspAT crystal, 256,270 reflections were observed and 39,537 independent reflections were obtained with a merging R-value of 0.102. The diffraction data set was 99.0% complete at the resolution of 2.5Å.

Diffraction spots from a FMN binding protein crystal were recorded at least up to 1.05Å resolution. Total 64,936 reflections were observed and 36,511 independent reflections were obtained with a merging R-value of 0.031. Summary of reflections intensities and R-factors by shells is shown in Table 1.

These results show that incident X-ray and our equipment installed in the hutch A of BL24XU have sufficient performance for ordinary protein crystallographic studies.

Table 1. Summary of reflections intensities and R-factors by shells

| Resolution | I | error | R |
|---|---|---|---|
| 20.00-2.26 | 6398.7 | 445.6 | 0.030 |
| 2.26-1.80 | 2093.5 | 151.9 | 0.028 |
| 1.80-1.57 | 788.6 | 65.2 | 0.037 |
| 1.57-1.42 | 453.2 | 45.3 | 0.032 |
| 1.42-1.32 | 312.7 | 38.6 | 0.050 |
| 1.32-1.24 | 263.5 | 37.8 | 0.033 |
| 1.24-1.18 | 223.8 | 37.3 | 0.073 |
| 1.18-1.13 | 199.5 | 37.5 | 0.098 |
| 1.13-1.09 | 145.7 | 35.6 | 0.136 |
| 1.09-1.05 | 111.5 | 31.7 | 0.095 |
| total | 1286.1 | 104.4 | 0.031 |