

Electron Spin Resonance in Microalgae

Whole-cells to Monitor Hydrogen Production

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Supplementary Information

1 ESR spectra elaboration

Spectra acquired in BrukerTM format were converted to text files by using MatLab [2] and the Easyspin package (version 6.0.6) [4]. The text files were loaded with R programs [3].

Each of the $I(B)$ functions were subtracted of the cavity signal acquired at the beginning of the same day of measurements and at the same microwave power. The resulting functions were corrected for an evident decrease in base-line. When the spectra were acquired at a window of 5000 G the first and last 75 points were used, while 150 points for each end were used for the 1000 G window. These points define the constraints of the base-line. The missing points of the base-line were interpolated using cubic spline in R and the Forsythe, Malcolm and Moler method (fmm) [1].

In Fig. S1 the elaboration is shown for one of the replicate I3 sample. See Methods for details.

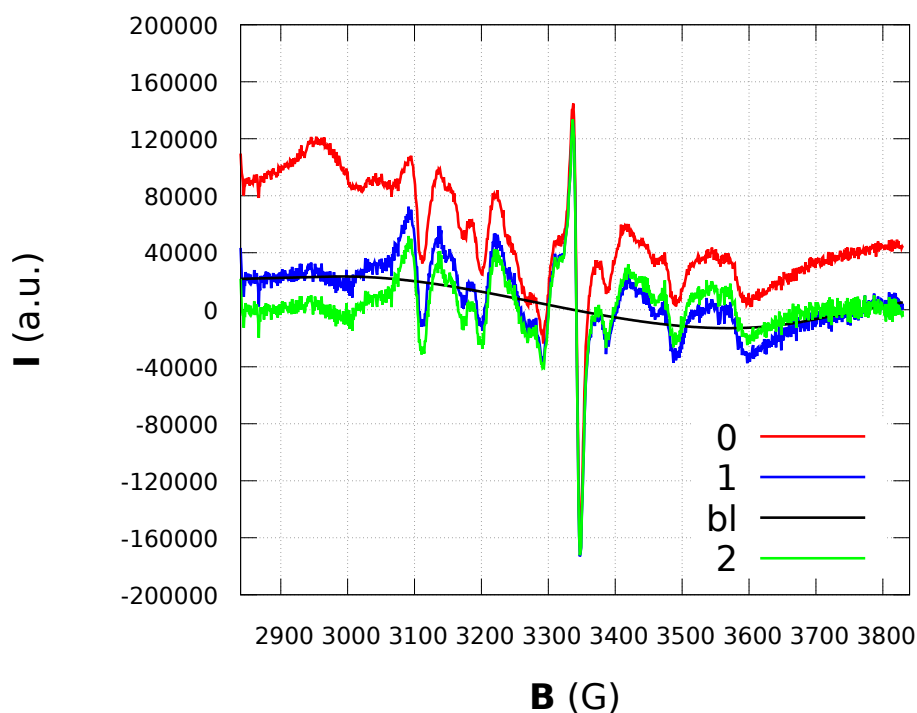


Figure S1: Spectrum elaboration of one replicate I3 sample (power is 1 mW, field window is 1000 G). Red - raw data (0); blue - result of cavity subtraction (1); black - base-line obtained by the interpolating cubic spline constrained to the 150 end points on each side of the blue curve (bl); green - corrected spectrum (2).

Once each of the spectra was corrected, they were averaged over replicate experiments. As for the given example (I3), the average result over the 3 replicates is presented in Fig. 2d in the manuscript.

Finally, the x-axis (B) of each spectrum was converted to g values using:

$$g = \frac{h\nu_0}{\mu_B B} , \quad (1)$$

where μ_B is the Bohr magneton, h is the Planck constant, the magnetic field B is in T, and ν_0 is the average, over replicates, of the frequency determined by the static magnetic field (MWFQ parameter of the Bruker DSC file).

References

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