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Influence of solvent effects on Qy transitions in chlorophyll

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<p>The most abundant and efficient light harvesting, energy transfer and transduction systems are found in nature within the process of photosynthesis. Although the processing sequences of an absorbed solar photon in the photosynthetic apparatus have been deciphered, the underlying physical basis of photosynthesis is not well understood yet. Our research aims to contribute to this understanding by characterising the level of organisation of the Light Harvesting II complexes (LHCII) and energy transfer systems when incorporated into artificial vesicles called Pheroid<sup>

TM</sup>. LHCII was extracted from spinach leaves in a 20 mM Tricine buffer to stabilise the proteins. Raman, FTIR and absorbance spectra of samples were compared. The Qy transitions of chlorophyll in the red (Qy) region of the absorption spectra appears to red-shift by 3.5 – 5.5 nm; indicating a possible change in organisation of the light harvesting system after incorporation into the Pheroid^{TM}. These shifts however could also be interpreted as bathochromic solvent effects due to the Tricine buffer. The objectives of this study were (1) to investigate whether the red-shifts were due to the Tricine buffer and (2) if so, whether the alternative use of a 20 mM K₂HPO₄ / KH₂PO₄ buffer could eliminate the bathochromic solvent effects. The Tricine buffer was dialysed out of the samples directly into a 20 mM K₂HPO₄ / KH₂PO₄ buffer to prevent denaturing of the LHCII proteins. Preliminary results indicated a lessening of the bathochromic effects with the K₂HPO₄ / KH₂PO₄ buffer.

Level (Hons, MSc,
   PhD, other)?

Researcher

Consider for a student
   award (Yes / No)?

No

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

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