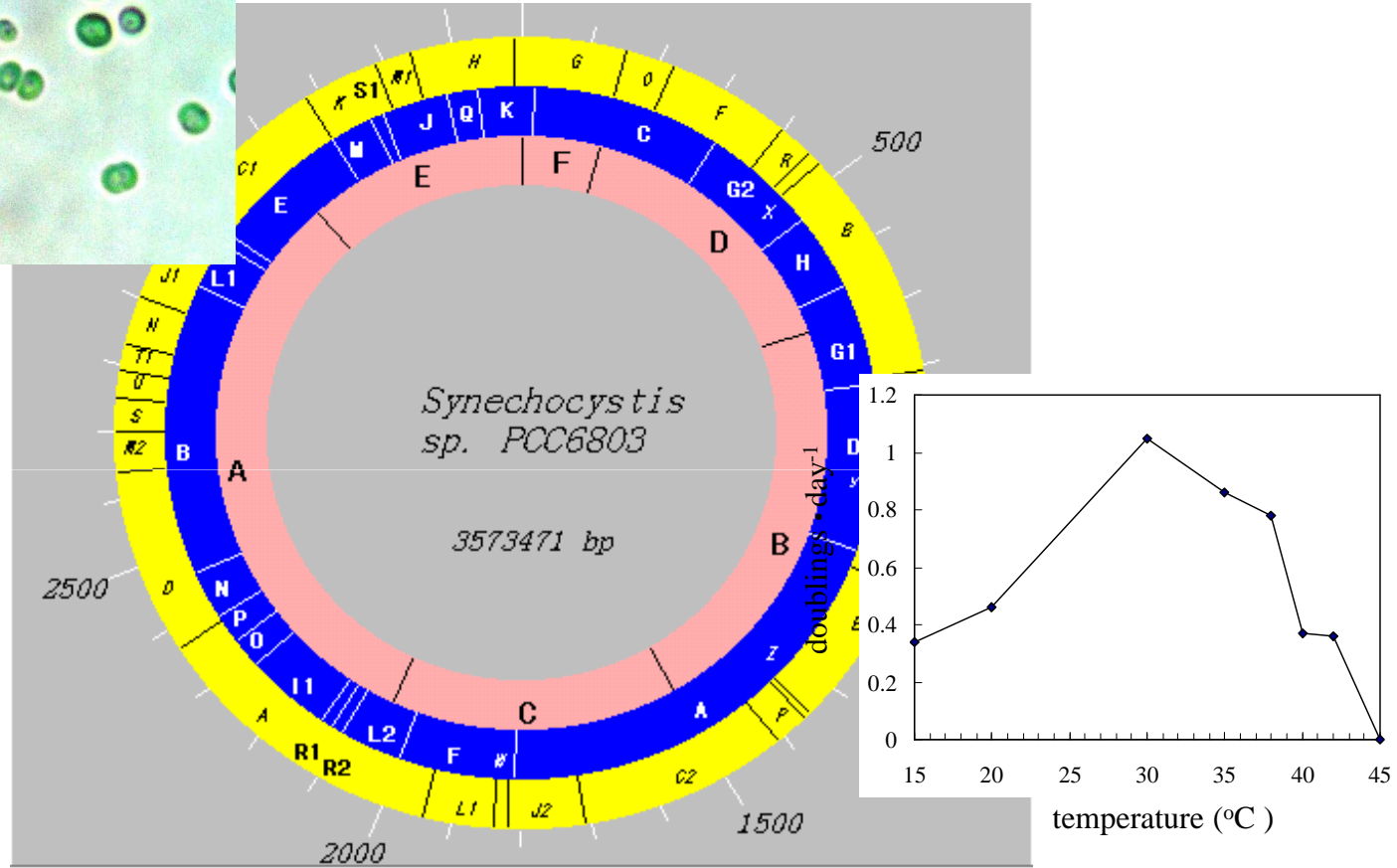
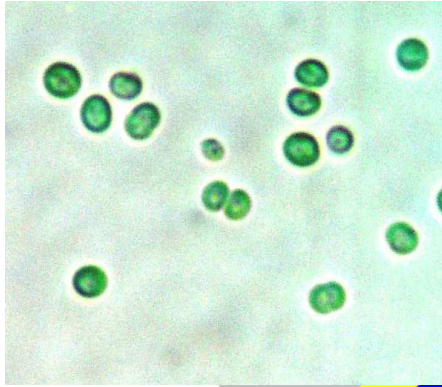


ESF-EMBO Symposium, Spain 2008

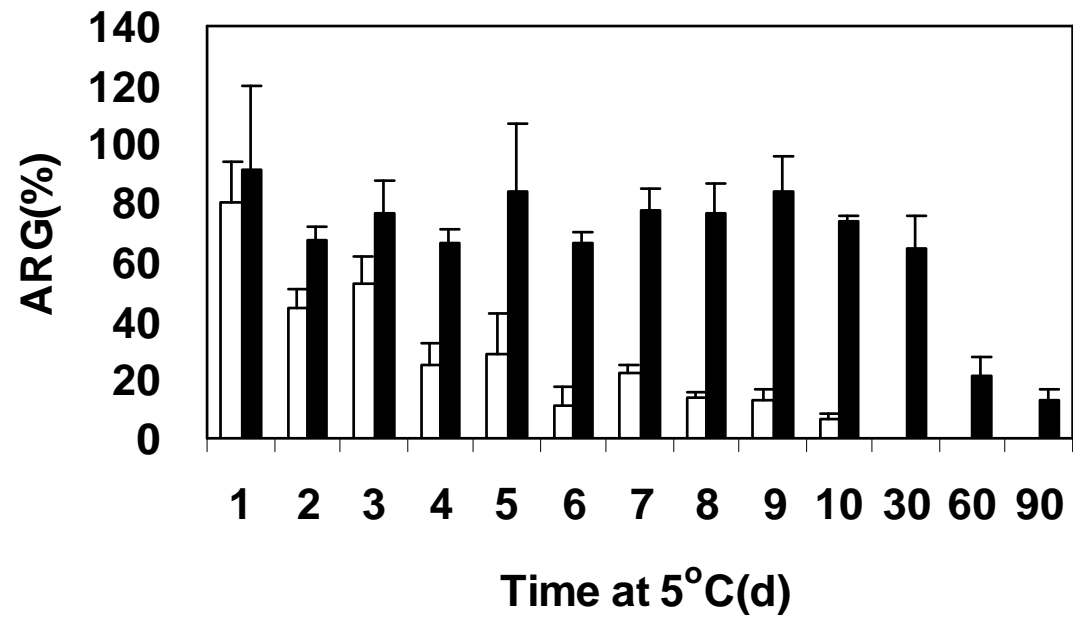
Acquired Chill-Light Tolerance of A Cyanobacterium

Xudong Xu

Institute of Hydrobiology, Chinese Academy of
Sciences, Wuhan, China



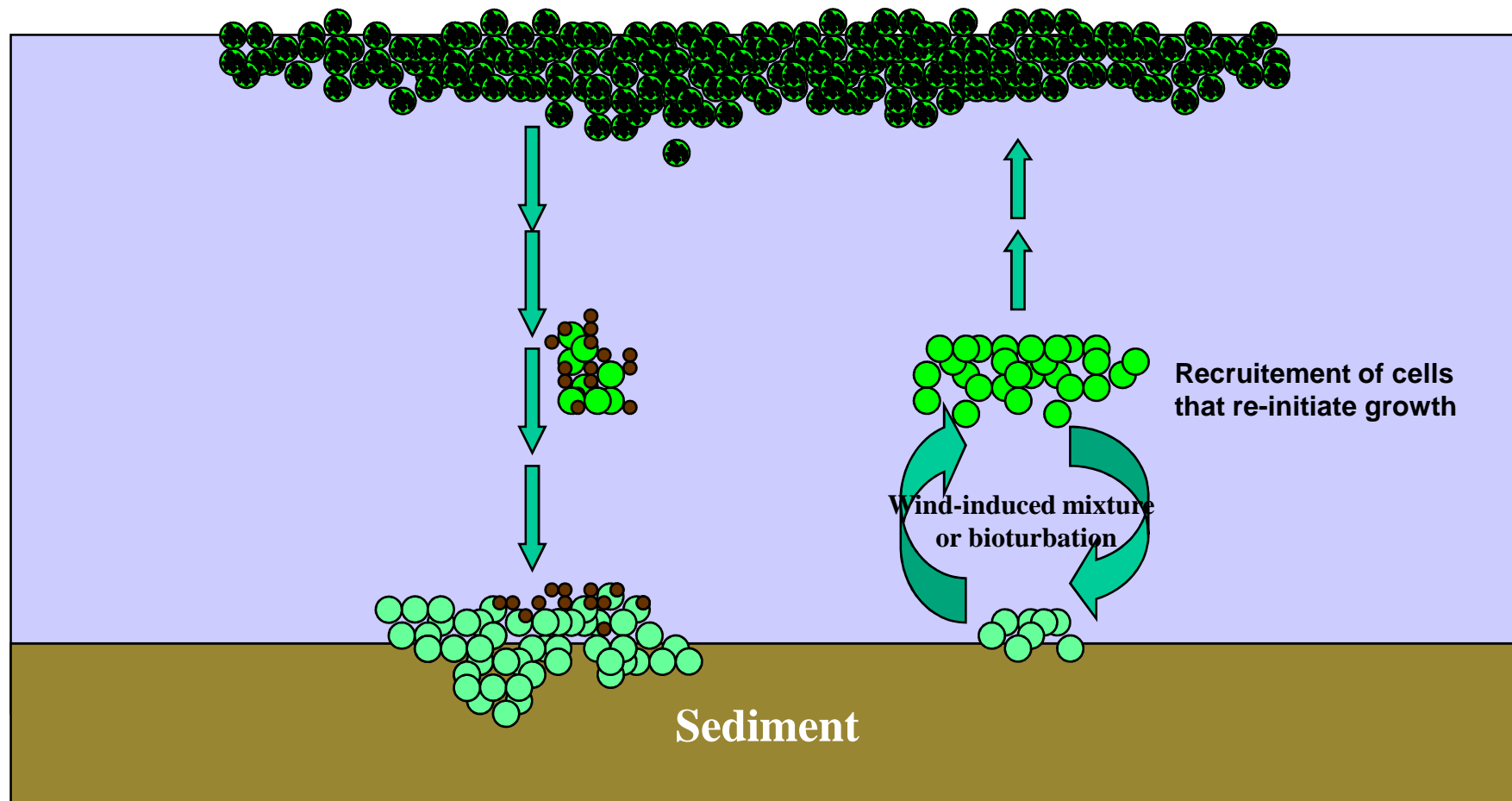
Synechocystis sp. PCC 6803

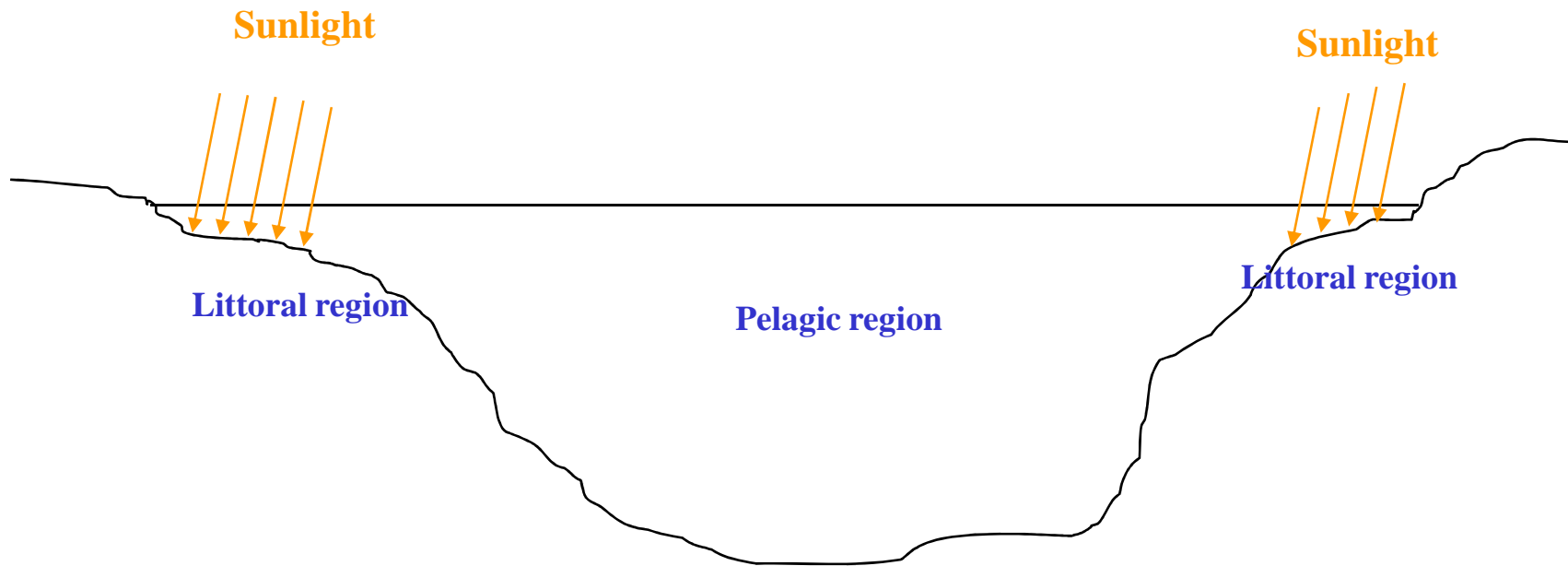


Solid bar: in dark

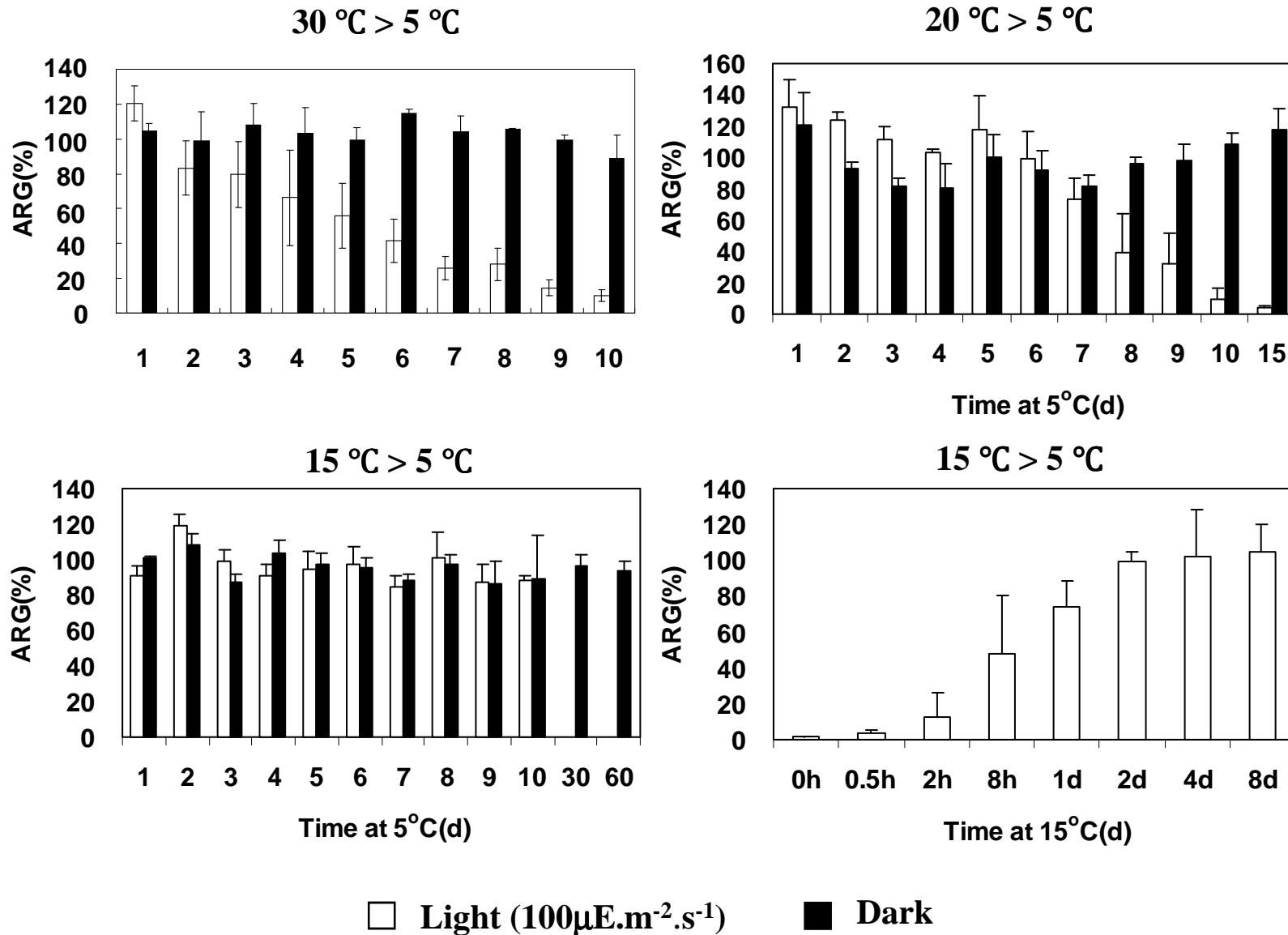
Empty bar: in light (100μE m⁻² s⁻¹)

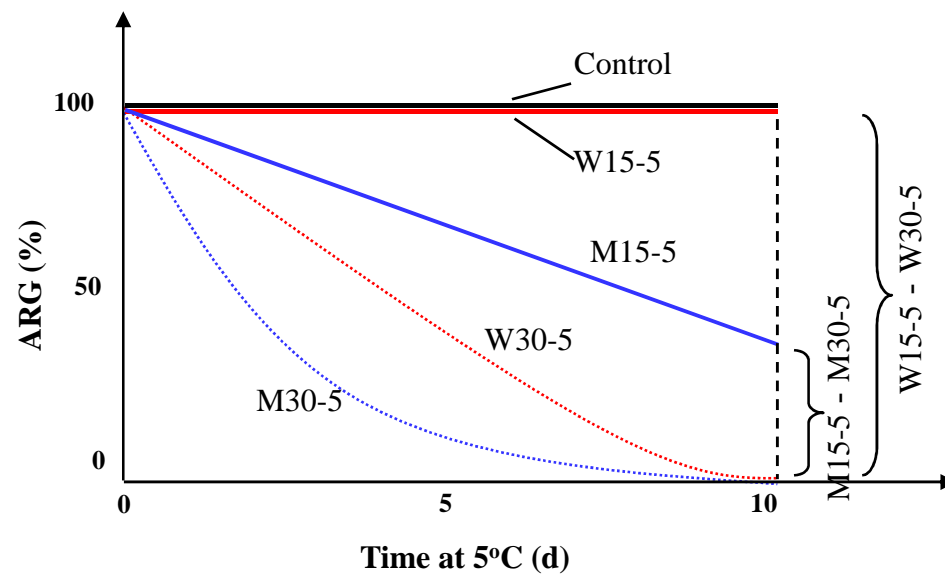
Surface waterbloom





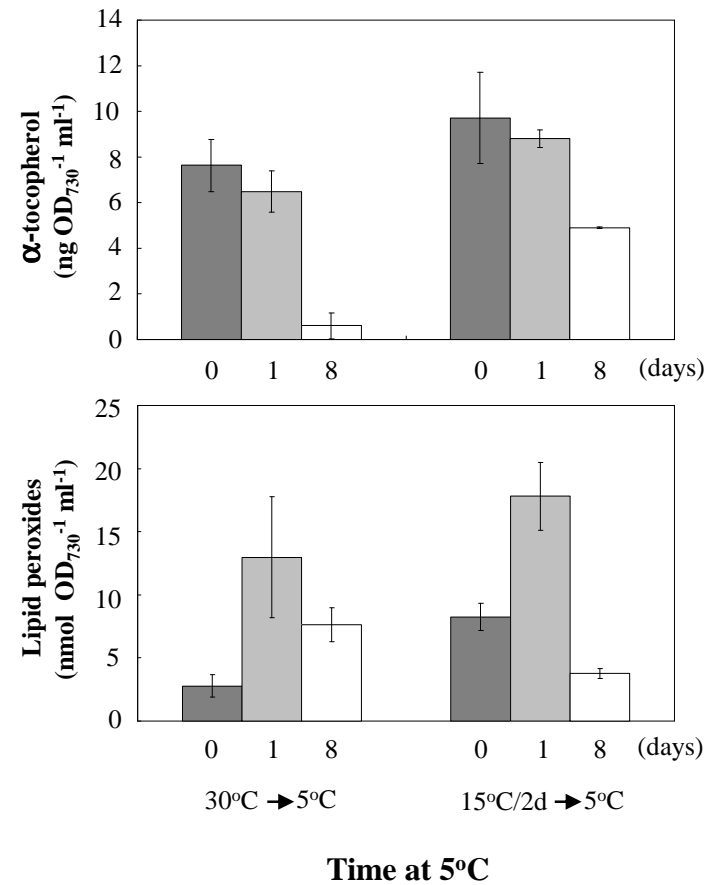
Acquired Chill-light Tolerance (ACLT) of *Synechocystis* sp. PCC 6803



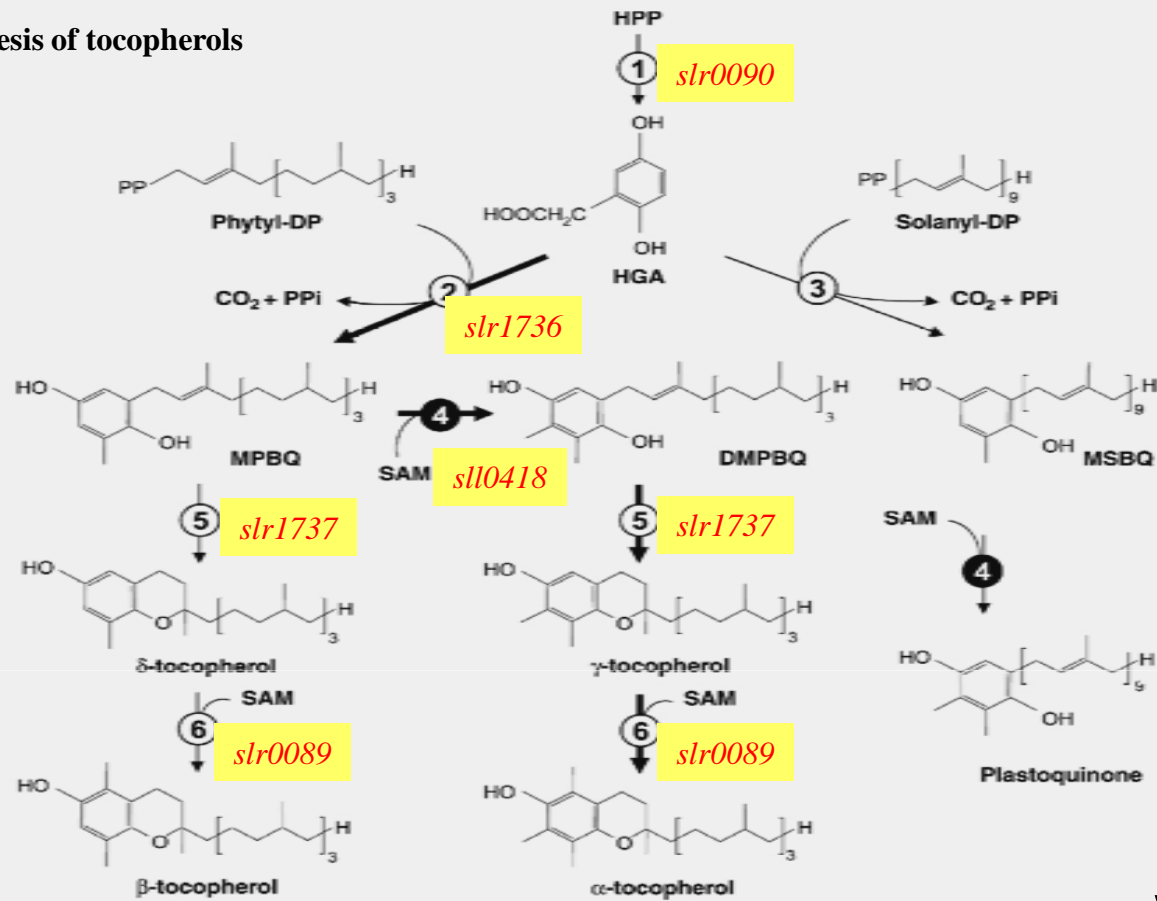


$$\text{RACLT}(\%) = \text{MOD15-5L} - \text{MOD30-5L} / \text{WOD15-5L} - \text{WOD30-5L}$$

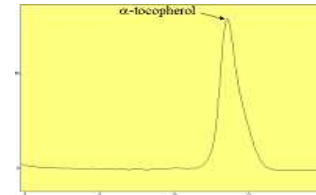
Effects of preconditioning at 15°C on α -tocopherol and lipid peroxidation in cells under chill-light stress



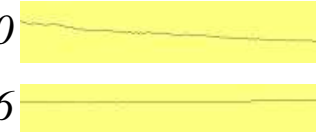
Synthesis of tocopherols



WT



slr0090



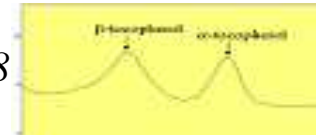
slr1736



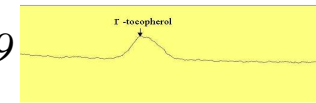
slr1737



slr0418



slr0089



slr0091



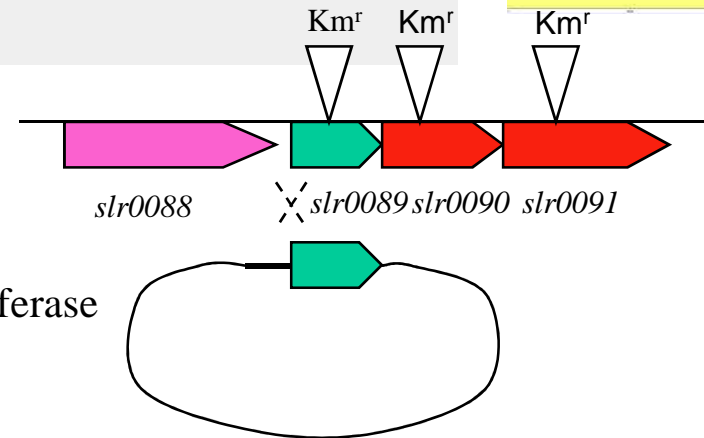
1 p-hydroxyphenylpyruvate dioxygenase (HPPD)

2 Homogentisate phytyltransferase (HPT)

4 2-methyl-6-phytyl-1,4-benzoquinone methyltransferase

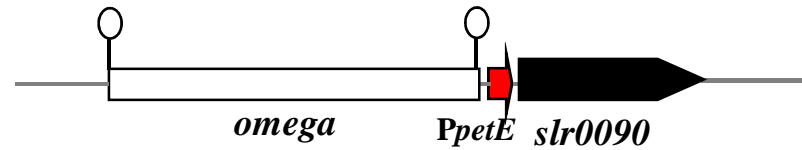
5 Tocopherol cyclase (TC)

6 γ -tocopherol methyltransferase

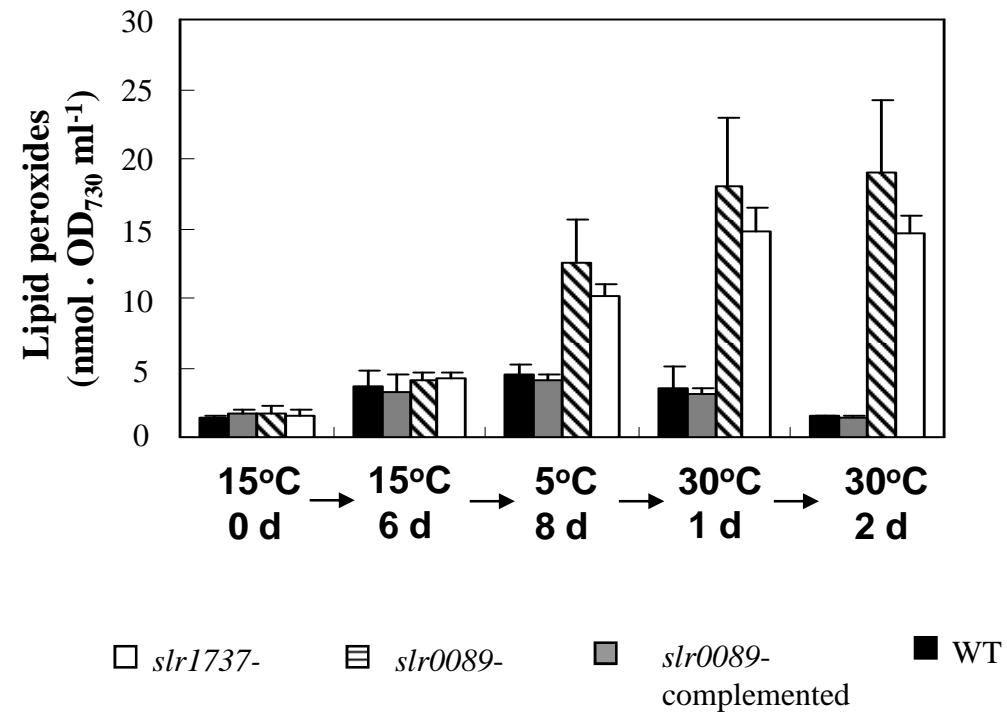


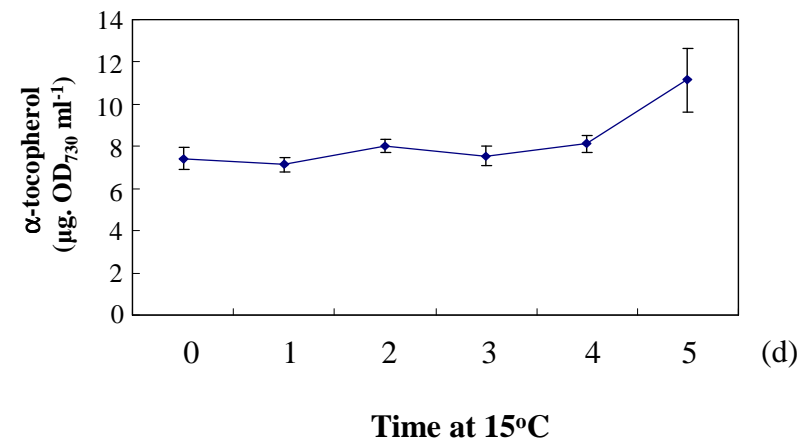
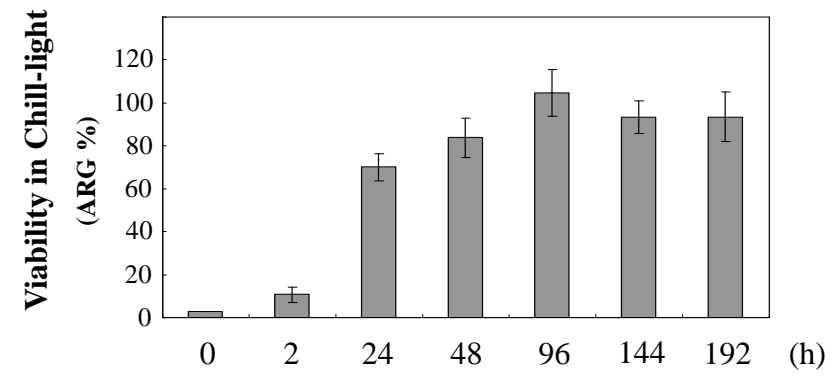
Strains	tocopherol (μg /g fresh weight))	RACLT (%)
WT	α 5.1\pm0.6	100
<i>slr1736::CK2</i>	No	3.3 \pm 0.6
<i>slr1737::CK2</i>	No	-0.3 \pm 2.9
<i>slr0090::CK2</i>	No	-2.0 \pm 2.7
<i>slr0089::CK2</i>	γ 1.4 \pm 0.02	1.9 \pm 0.6
<i>slr0089::CK2</i> Complemented	α 7.1\pm0.2	94\pm6.0
<i>slr0091::CK2</i>	α 6.1\pm2.0	96\pm4.4

Control of tocopherol synthesis with a copper-regulated promoter



Cu	α -tocopherol ($\mu\text{g} / \text{g}$ fresh weight))	RACLT (%)
+	9.3 ± 1.8	96 ± 2.4
-	0.9 ± 0.1	9.5 ± 0.6





Hypothesis about the ACLT

30°C \Rightarrow **15°C** \Rightarrow **5°C, light**

Protein synthesis



Tocopherol synthesis



Institute of Hydrobiology, Chinese Academy of Sciences