

## EFFECT OF LIGHT ON THE ACCUMULATION OF FREE AMINO ACIDS IN THE MARINE DIATOM SKELETONEMA COSTATUM RESTING CELLS DURING GERMINATION

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The influence of light on nitrogen uptake and the accumulation of free amino acids in *Skeletonema costatum* resting cells during germination, but before cell division, were studied. Nitrogen (N) uptake occurred prior to cell division when cells were placed in the light. Carbon fixation might be taking place simultaneously due to the increasing free amino acid concentration. Different rates of N uptake were measured after 3h depending on irradiance to the rejuvenating cells, and the results showed a large increase at 225 and 300  $\mu\text{mol quanta m}^{-2} \text{ s}^{-1}$  after 12h. The rapid and increasing N uptake at high light enabled *S. costatum* to rebuild and reorganize its cell contents quickly and to dominate subsequent vegetative growth. Compared to those in the logarithmic phase and stationary phase, much higher concentrations of amino acids glycine (Gly) and histidine (His) were detected in resting cells. The amino acid His appeared to be a storage compound in *S. costatum* resting cells. Furthermore, alanine(Ala), proline (Pro), Gly and His in *S. costatum* resting cells could be associated with the survival of resting cells in unfavorable environments, such as anoxic, cold, dark and heavy metal stress, and with the following recovery process. Compared to glutamine at 12h and 36h, glutamate had the highest  $^{15}\text{N}$  labeling enrichment at 3h, 6h, 24, 30h and 48h, showing a diel variation of N status during germination. The  $^{15}\text{N}$  labeled urea was detected at 36h, compared to the urea cycle intermediates, ornithine and citrulline at 30h, indicating that urea was produced as an N reservoir due to the higher nitrogen uptake in the dark, and the urea cycle was involved in *S. costatum* resting cell germination. However, in resting cell germination, Pro could be produced by other activity, other than the urea cycle.

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