

Abstract

The smallest free living eukaryote known as *Ostreococcus tauri* became along with some related species great experimental models for iron uptake research in marine picoplankton. The ecological context of such topic is very interesting considering the nature of adaptation to iron limitation and its connection to the copper metabolism. Our experiments has simulated iron and copper limiting conditions of the ocean, as a control we used iron and copper repleted cultivation media. The maximum cell counts were two- to threefold higher in iron-repleted medium compared to iron-depleted one. There was the only exception showing no difference in growth – *O. lucimarinus* coming from open ocean with high irradiance levels and very low iron concentrations, which all together made it the best adapted species. The reinoculation of cell cultures after a week cultivation into to the same iron/copper containing media led to unmasking the copper effect on growth, which was much weaker than encountered with iron (again except of *O. lucimarinus*). Iron sufficiency positively affects heme *b* and chlorophyll *a* and *b* content with no significant copper dependency. The circadian timing of heme *b* and chlorophyll *a* and *b* content shows the increasing trend during the day followed by decrease at night. This might be caused by supplementation of photosynthesis requirements during the day or the later decrease at night might be connected with the cell division occurring by that time. Nitrate reductase expression is also connected with iron and copper repletion, the higher the concentration, the higher expression was detected. Finally, we purified and identified the major iron binding protein in iron starving cells.