

**Title :** Exploring cyclic electron flow around photosystem I in microalgae species

**Abstract**

Microalgae supplies virtually all the oceanic trophic chains and participate in almost half of photosynthesis on Earth. Although their genetic diversity is well known, their functional diversity remains little explored. The main route of photosynthesis, the linear flux of electrons from water to CO<sub>2</sub>, seems to be well conserved among phylogeny. It involves two photosystems working in series, the photosystem II (PSII) and I (PSI). In plants and green algae, there is a cyclic electron flow that involves only the PSI which would be crucial for photosynthetic regulation. The study of this cyclic electron flow is hampered by the absence of robust method to measure it. We have shown that the most used method for estimating PSI activity is unreliable. On this basis, we propose an alternative method to detect the presence of cyclic electron flow and to study its dependence on the linear flux. We could show very different behaviors between species of microalgae. Finally, the study of an efflorescence of the coccolithophore *Emiliana huxleyi* in mesocosm allowed us to highlight a signature of the cells infection by a virus which could involve the cyclic electron flow around the PSI.

**Keywords**

phytoplankton, dinoflagellate, coccolithophore, diatom, chlorophyte, photosynthesis, cyclic electron transfer, photosystem, viral infection, mesocosm