Taylor & Francis
Taylor & Francis Group

European Journal of Phycology

ISSN: 0967-0262 (Print) 1469-4433 (Online) Journal homepage: https://www.tandfonline.com/loi/tejp20

Posters

To cite this article: (2019) Posters, European Journal of Phycology, 54:sup1, 1-109, DOI: 10.1080/09670262.2019.1626628

To link to this article: https://doi.org/10.1080/09670262.2019.1626628

Published online: 20 Aug 2019.

variability in nutrients input was also observed. Coccolithophore *S. halldalii* consists of only the heterococcolith life-cycle phase. Cell morphology was analysed using SEM, showing similarities in the relative sizes of apical and body coccoliths and the presence of protruding teeth along the inner margin of apical coccoliths.

7PO.8

INVESTIGATING THE ROLE OF CHLOROPLAST CA^{2+} SIGNALLING IN DIATOMS

Serena Flori (serflo@mba.ac.uk), Glen Wheeler (glw@mba.ac.uk) and Colin Brownlee (cbr@mba.ac.uk)

The Marine Biological Association of the UK, The Laboratory, Citadel Hill, Plymouth PL1 2PB, UK

Ca^{2+} plays an important role in many signaling pathways in eukaryotes. Abiotic and biotic inputs, such as pathogen attacks, osmotic or oxidative stress result in specific Ca^{2+} elevations within the cytosol that activate a range of downstream signal transduction pathways. Recently, it has become clear that Ca^{2+} elevations may also occur in organelles, with chloroplast Ca^{2+} signaling implicated in the regulation of several aspects of photosynthesis in land plants. However, little is known about Ca^{2+} signaling in diatoms (see Falciatore et al., 2000; Vardi et al., 2008), and the complex evolutionary origins of their plastids via secondary endosymbiosis suggest that they may possess alternative Ca^{2+} signaling pathways from those identified in plants and green algae. In this project, we investigate the role of Ca^{2+} signaling in diatom chloroplasts in response to environmental stress. The approach we employed is to use genetically-encoded calcium sensors targeted to different organelles in the model diatom *Phaeodactylum tricornutum*. In this study, we have been able to monitor intracellular Ca^{2+} signaling in response to oversaturating light, oxidative stress and hyperosmotic shocks. Our preliminary data indicate that organelle-specific Ca^{2+} transients are present in response to different environmental stimuli. The results demonstrate that chloroplast-localized Ca^{2+} signaling also occurs in plastids derived by secondary endosymbiosis and suggest that Ca^{2+} is likely to play a major role in the regulation of photosynthesis in diatoms.

7PO.9

THE ROLE OF LHCX PROTEINS AND THE MECHANISM OF NON-PHOTOCHEMICAL FLUORESCENCE QUENCHING IN THE DIATOM *PHAEODACTYLUM TRICORNUTUM*

Jochen Buck[1] (Jochen.Buck@uni-konstanz.de), Jonathan Sherman[2] (sherman@marine.rutgers.edu), Peter Kroth[1] (Peter.Kroth@uni-konstanz.de), Paul Falkowski[2] (falko@marine.rutgers.edu) and Bernard Lepetit[1] (Bernard.Lepetit@uni-konstanz.de)

[1]Department of Plant Ecophysiology, University of Konstanz, 78457 Konstanz, Germany and [2]Department of Marine and Coastal Sciences, Rutgers University, 71 Dudley Road New Brunswick, NJ 08901, USA.

Diatoms possess a high capacity for qE (energy-dependent fluorescence quenching), the fast, proton gradient and xanthophyll cycle-dependent part of non-photochemical quenching (NPQ). This process enables them to populate aquatic environments with fast-changing light conditions, e.g. coastal or upwelling regions. Together with the xanthophyll cycle, Lhcx proteins define the qE capacity of diatoms. *Phaeodactylum tricornutum* owns four highly similar Lhcx isoforms, each being specifically expressed during acclimation to various stress conditions, leading to varying qE levels. In our experiments, we knocked out the *Lhcx1* and *Lhcx2* genes in *P. tricornutum*. The Lhcx1 knockout strains lack Lhcx proteins under non-stressed, low light growth conditions, which results in a complete lack of qE capacity. The Lhcx2 knockout shows no difference in qE level under low light compared to the wild type, but exhibits only a limited capacity to increase qE upon acclimation to prolonged high light. As the Lhcx1 knockout provides an Lhcx-free background, we can investigate the functions of each different isoform by cloning them individually into this background. This way, we obtained multiple mutants with different qE capacities. Based on these lines, we established a clear link between Lhcx expression and qE capacity. Moreover, we demonstrate that Lhcx mediated qE capacity is directly connected to rapid changes in the functional absorption cross-section of photosystem II. Our results provide fundamental insights into the process of qE in diatoms.

7PO.10

THE EFFECTS OF IONIZING IRRADIATION ON GROWTH AND LIPID PRODUCTION IN *CHLORELLA SOROKINIANA*

Mima Romanović[1] (romanovicmima92@gmail.com), Marina Stanić[1] (mstanic@imsi.rs), Jelena Bogdanović Pristov[1] (mala@imsi.rs), Arian Morina[1] (arian_morina@yahoo.com), Milena Dimitrijević[1] (milena.dimitrijevic@imsi.rs), Jon Pittman[2] (jon.pittman@manchester.ac.uk) and Ivan Spasojević[1] (ivan@imsi.rs)

[1]Life Sciences Department, Institute for Multidisciplinary Research, University of Belgrade, Kneza Višeslava 1, 11030 Belgrade, Serbia [2]School of Earth and Environmental Sciences, University of Manchester, Michael Smith Building, Oxford Road, Manchester, M13 9PT, UK

The impact of ionizing radiation on microalgae represents an important biotechnological and environmental issue. However, it has not been sufficiently investigated. Herein, we analyzed the effects of low-dose X-radiation on the growth, lipid production, and chlorophyll (*Chl*) and carotenoids content in *Chlorella sorokiniana* (CCAP 211/8K), which is both, a model and biotechnologically relevant species. *C. sorokiniana* culture was grown in 3N-BBM+V medium, at 22°C with a continuous photon flux of 120 μmol m^{-2} s^{-1}. X-ray irradiation was applied in the early exponential phase of growth, at different doses (1, 2, 5, 10, 20 Gy) and rates (0.06, 0.24, 0.55 Gy/min). Parameters were monitored for 30 days. The exposure to 2 Gy and 5 Gy had a positive impact on biomass production. Dry weight was significantly higher in treated cultures than controls at days 25 and 30. Total lipid content (according to Nile Red fluorescence assay) was increased at day 30 in cultures exposed to 1 Gy (0.06 Gy/min) and 5 Gy (0.24 Gy/min). *Chl* content was increased for these doses in the exponential phase of growth. *Chl b* and carotenoids content was not significantly affected by irradiation. It is noteworthy that higher doses (10 and 20 Gy) had suppressing effects on growth and lipid production. The positive effects of ionizing radiation on biomass and lipid production can be attributed to the phenomenon of radiation hormesis (beneficial effects of low dose radiation on different biological parameters). Radiation hormesis has been shown previously documented on a number of plant species, and can be potentially employed in microalgae industry. On the other hand, microalgae are exposed to increased levels of ionizing irradiation in aquatic systems that are infested with radionuclides either naturally or by anthropogenic activity. Our results may add to the understanding of eco-physiology of microalgae in such systems.

7PO.11

CHANGES IN MOTILITY AND ADHESION BEHAVIOR OF *DUNALIELLA TERTIOLECTA* BUTCHER UNDER PRESENCE OF HEAVY METAL CADMIUM

Nives Novosel[1] (Nives.Novosel@irb.hr), Petar Žutinić[2] (petar.zutinic@biol.pmf.hr), Damir Kasum[1] (dkasum@lipanj.org), Tarzan Legović[1] (legovic@irb.hr) and Nadica Ivošević DeNardis[1] (ivosevic@irb.hr)

[1]*Division for Marine and Environmental Research, Ruđer Bošković Institute, POB 180, 10000 Zagreb, Croatia and* [2]*Department of Biology, Faculty of Science, University of Zagreb, Rooseveltov trg 6, 10000 Zagreb, Croatia*

The aim of this study was to examine algal cell behavior in the growth medium and in the presence of heavy metal cadmium. Motility and adhesion behavior at the model interface was analyzed. Selected model species was *Dunaliella tertiolecta* Butcher, a motile green alga that possesses two flagella of equal length. Deficiency of a rigid cell wall makes this species very susceptible to changes in the ecosystem, thus making it an excellent choice in stress research. Optical microscopy was used to determine cell abundance and to capture videos for motility analyses. Algal cell motility parameters, such as velocity, length and shape of trajectories, were tracked and analyzed with an open-access bioimaging software ICY (The Institut Pasteur, France). Changes in motility parameters, in terms of the reduced number of motile cells and slower velocity, were determined. Electrochemical methods of polarography and amperometry at the dropping mercury electrode were used to characterize cell suspension in terms of the level of polydispersity and potential range of cell adhesion. Increase of cadmium concentration in the culture resulted in a decrease of cell abundance and occurrence of released surface-active particles and micro aggregates, presumably as a consequence of the stress-induced metabolic activity. Adhesion behavior at the broader potential range remains preserved. Since dissolved heavy metals are widely dispersed water pollutants due to industrial, agricultural and urban development, these results will help improve the knowledge about survival and adaptation capability of algal organisms in the stress-impacted aquatic ecosystems.

7PO.12

HYDROLASES INVOLVED IN METABOLISM OF PARAMYLON IN EUGLENOID FLAGELLATES

Martina Kešeľáková (mkeselakova@gmail.com) and Juraj Krajčovič (juraj.krajcovic@ucm.sk)

Department of Biology, Faculty of Natural Sciences, University of Ss. Cyril and Methodius in Trnava, J. Herdu 2, 917 01 Trnava, Slovakia

Paramylon is a linear β-1,3-glucan produced by *Euglena gracilis* and some other Euglenozoan microorganisms as an intracellular storage carbohydrate. Under the aerobic condition, *Euglena* is able to accumulate large amounts of paramylon grains, making up around 80% of the dry weight of the cell. The stored polysaccharide can then be anaerobically degraded via glycoside hydrolase enzymes what subsequently leads to wax ester synthesis process. Furthermore, the immunostimulatory effect of paramylon is induced by generated shorter-chain β-glucans which are required for the activation of the immune response. In general, paramylon belongs to bioactive β-glucans with different medical and