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CHANGES OF PHOTOSYNTHETIC PARAMETERS IN MICROALGAE INDUCED BY PHOTOOXIDATIVE STRESS

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Oxidative stress in algae could be caused by abiotic stressors, e.g. exposure to heavy metals, chemicals, light and heat stress, thus acting as nonspecific response to harmful factors. Although, because of their sensitive response algae and other photosynthetic microorganisms are used as natural indicators in environmental studies, there is still a lack of complex knowledge of whether the responses elicited by different factors would have common features. As photosynthetic activity is highly associated with physiological state of the plant, non-invasive tools, such as spectroscopy and microscopy, application *in vivo* are preferred.

In this study oxidative stress was caused by different stressors on *Desmodesmus communis* freshwater microalgae. To determine physiological responses induced by H_2O_2, white and violet light (829 µmol photons/(m^2s) irradiation for 90 min and 1012 µmol photons /(m^2s) for 30 min respectively), steady-state fluorescence and photosynthetic parameters measured by pulsed amplitude modulated fluorometer as well as microscopic images of algae were analysed. A ratio of autofluorescence (at 683 nm) excitation intensities at 484 nm and 435 nm (Fig. 1 a), as well as electron transport rate through PSII (Fig. 1 b) decreased immediately after algae exposure, although, depending on stressor, after 24 hours parameters tend to approach control values. Furthermore, the effects of chlorophyllin as a photosensitizer has also been studied with these algae.

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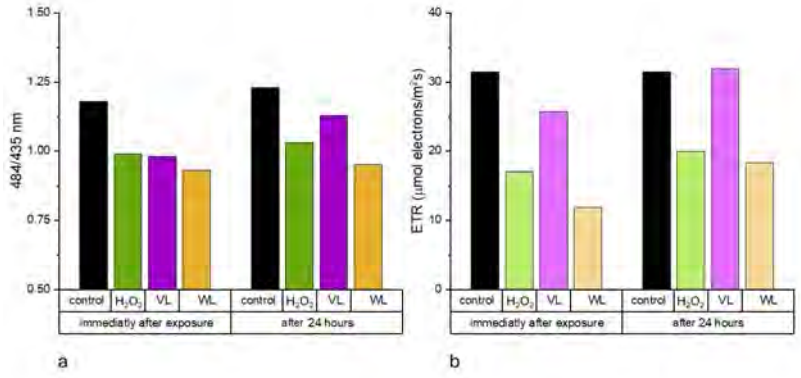

Fig. 1. The rate of excitation at 484 nm and 435 nm of autofluorescence intensities at 683 nm (a) and electron transport rate (b) of algae immediately after exposure with hydrogen peroxide (H_2O_2), violet light (VL) and white light (WL).