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EFFECTS OF TEMPERATURE AND SALINITY ON NITRATE UPTAKE BY GREEN MACROALGAE

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Temperature, salinity and the availability of dissolved inorganic nutrients are amongst the most important abiotic factors driving macroalgae production in estuarine and coastal ecosystems. Nitrate is particularly important in environments impacted by anthropogenic discharges wherein green macroalgae (e.g. *Ulva* and *Enteromorpha*) might rapidly benefit from its availability originating blooms. Within macroalgae cells, nitrate needs to be reduced to nitrite (through the nitrate reductase pathway) and again to ammonia (through the nitrite reductase pathway) before being incorporated into amino acids. The goal of this study was to evaluate and contrast the effects of temperature and salinity on nitrate reductase activity (NRA) in *Ulva* and *Enteromorpha*. Nitrate reductase was quantified using an *in situ* method allowing the determination of NRA in living cells and hence simulating/mimicking organisms' response to changing environmental conditions in close to field conditions. More specifically, the *in situ* method uses potassium nitrate as substrate and propanol as a membrane permeabiliser, allowing the nitrite thus produced to exit macroalgae cells into the assay medium where it is quantified through a colorimetric method carried out using a FOSS Flow Injection Analyser (FIAstar 5000) within an hour. Our results show that both *Ulva* and *Enteromorpha* have maximum nitrate reductase activity at salinities levels of local saltwater, although nitrate reduction can occur in freshwater or brackish water, but at lower rates. NRA covaried with temperature for both algae, although *Ulva* showed maximum NRA at 30 ºC while NRA peaked at 35 ºC in *Enteromorpha*. This observation might explain why *Ulva* blooms decay at the beginning of summer whereas *Enteromorpha* persists during the warmer months in temperate tidal lagoons, like the Ria Formosa (South of Portugal).