The following supplement accompanies the article

Effect of short-term light- and UV-stress on DMSP, DMS, and DMSP lyase activity in *Emiliania huxleyi*

Louise J. Darroch, Michel Lavoie, Maurice Levasseur*, Isabelle Laurion, William Sunda, Sonia Michaud, Michael Scarratt, Michel Gosselin, Gitane Caron

*Corresponding author: maurice.levasseur@bio.ulaval.ca

Aquatic Microbial Ecology: 74: 173–185 (2015)

---

1. Biologically effective dose for the high light treatment

A biologically effective dose ($BED_{DNA300nm}$) was calculated for the high light (HL) treatment. To do this the UVR lamp spectrum provided by Q-Panel Lab Products was adjusted to the UVR irradiance measured in the incubator, weighted with the deoxyribonucleic acid (DNA) action spectra of Setlow (1974; normalized at 300 nm) and multiplied by the exposure period. The $BED_{DNA300nm}$ under the HL treatment corresponded to ca. 190 J m^{-2} after 4.5 h.

2. Optimisation of the DMSP lyase enzymatic assay

The effects of pH and NaCl concentration on DMSP lyase potential activity (DLPA) were investigated to optimize the enzyme assay. To determine the effect of pH on enzyme activity, four unreplicated assays were carried out in a series of citric acid/phosphate buffers (pH 4, 5, 6, and 7) containing 0.5 M NaCl. DLPA increased with pH, and was highest at pH 7 (Fig. S1A). The effect of NaCl concentrations on DLPA was investigated at pH 6, also in unreplicated assays. The enzyme activity was constant for added concentrations of NaCl from 0 to 1 M and decreased at 2 M (Fig. S1B). We subsequently chose a NaCl concentration of 0.5 M and a pH of 7 as conditions for the DMSP lyase assay.

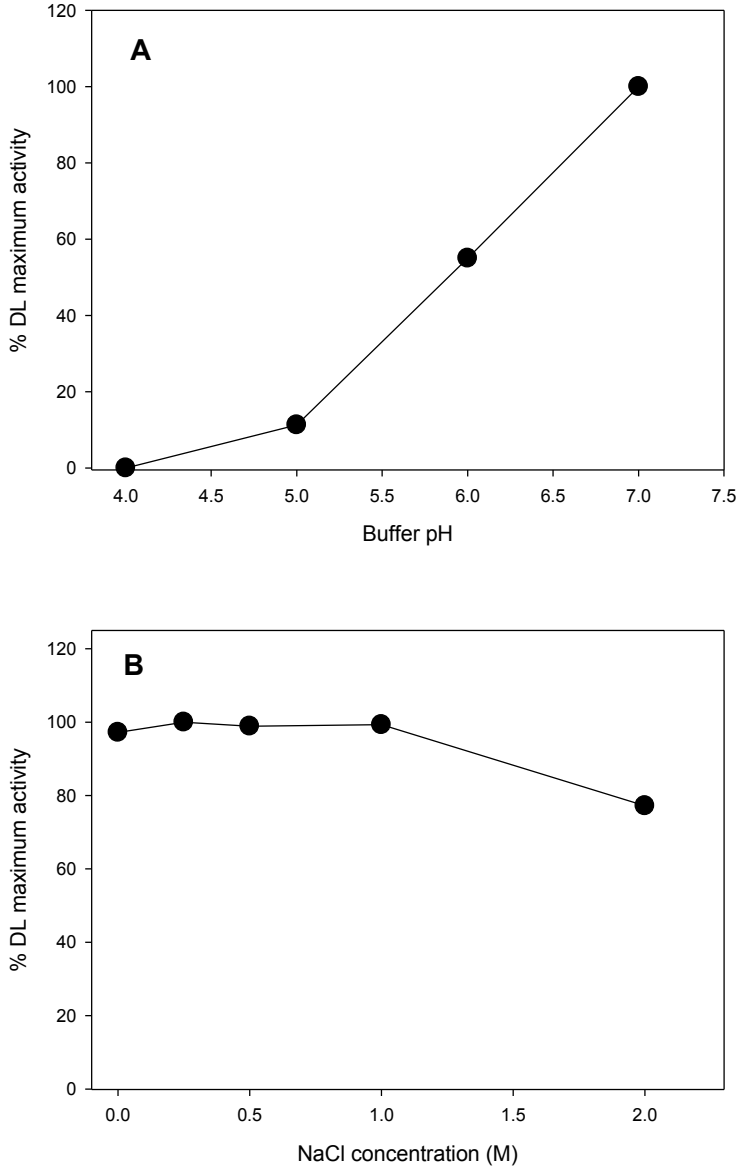

Figure S1. Effect of pH and salt (NaCl) concentration on DMSP lyase potential activity (DLPA) in *E. huxleyi* (CCMP 1742). (A) Activity in citric acid/phosphate buffer containing 0.5 M NaCl adjusted to various pH (range 4 – 7). (B) Activity in 163 mM citric acid/phosphate buffer (pH 6) with various concentrations of NaCl (0 – 2 M).

3. Comparison of DMSP lyase potential activity in different *Emiliania huxleyi* strains

Our DLPA values measured at pH 7, 30°C, and 0.5 M NaCl in *E. huxleyi* (CCMP 1742) were compared with those determined in six other strains of *E. huxleyi* at the same temperature and NaCl concentration (Steinke et al. 1998). For comparison with our results, DLPA values reported at pH 6 by Steinke et al. (1998) were adjusted those valid at pH 7 using the relationships between DLPA and pH reported in that paper. The DLPA of our experimental strain (CCMP 1742) was similar to those of the high DLPA strains (CCMP 373 and CCMP379), but 40- to 400-fold higher than the other lower DLPA strains. Thus strain CCMP 1742 can be considered a high DLPA strain.

Table S1. Mean DMSP lyase potential activity (DLPA) in different strains of *Emiliania huxleyi*.

Emiliania huxleyi strain	Mean DLPA (pH 7) fmol DMS $cell^{-1}$ min^{-1}	References
CCMP 373	5	Steinke et al. 1998
CCMP 1742	0.8	This study
CCMP 379	0.5	Steinke et al. 1998
L	0.018	Steinke et al. 1998
CCMP 370	0.012	Steinke et al. 1998
1516	0.009	Steinke et al. 1998
CCMP 374	0.002	Steinke et al. 1998

4. References

Setlow RB (1974) Wavelengths in sunlight effective in producing skin cancer - Theoretical analysis. Proc. Natl. Acad. Sci. USA 71:3363-3366

Steinke M, Wolfe GV, Kirst GO (1998) Partial characterisation of dimethylsulfonio-propionate (DMSP) lyase isozymes in 6 strains of *Emiliania Huxleyi*. Mar. Ecol. Prog. Ser. 175: 215-225