

Supplementary data for the article:

Article

Response of Juvenile *Saccharina japonica* to the Combined Stressors of Elevated pCO₂ and Excess Copper

Wenze Zhang ^{1,2,3}, Lianghua He ^{1,2}, Jiangqi Pan ^{1,2}, Yuhong Zhou ^{1,2}, Ruxiang Ge ^{1,2}, Sufang Li ⁴, Yunyun Shi ^{1,2}, Xinhua Chen ^{1,2,*}, and Yaoyao Chu ^{1,2,*}

¹ College of Marine Sciences, Fujian Agriculture and Forestry University, Fuzhou 350002, China

² Key Laboratory of Marine Biotechnology of Fujian Province, Institute of Oceanology, Fujian Agriculture and Forestry University, Fuzhou 350002, China

³ Department of Aquaculture and Aquatic Sciences, Kunsan National University, Gunsan 54150, South Korea

⁴ Laboratoire Génie des Procédés et Matériaux (LGPM), CentraleSupélec, Université Paris-Saclay, 91190 Gif-sur-Yvette, France

* Correspondence: chenxinhua@tio.org.cn; chuyaoyao@fafu.edu.cn

Table S1. Analysis of variance (two-way ANOVA) examining the effects of pCO₂ level and copper condition on RGR, F_v/F_m , rETR, NPQ, Chl *a*, Chl *c*, Car and soluble carbohydrates of juvenile sporophytes of *Saccharina japonica*.

Factors	df	F	P
RGR			
pCO ₂	1	66.853	< 0.001
Copper	3	12.913	< 0.001
pCO ₂ × Copper	3	15.001	< 0.001
F_v/F_m			

pCO ₂	1	32.396	< 0.001
Copper	3	3.829	0.031
pCO ₂ × Copper	3	1.309	0.306
rETR			
pCO ₂	1	26.661	< 0.001
Copper	3	0.786	0.519
pCO ₂ × Copper	3	4.464	0.018
NPQ			
pCO ₂	1	20.616	< 0.001
Copper	3	0.972	0.430
pCO ₂ × Copper	3	4.169	0.023
Chl <i>a</i>			
pCO ₂	1	51.247	< 0.001
Copper	3	10.890	< 0.001
pCO ₂ × Copper	3	4.966	0.013
Chl <i>c</i>			
pCO ₂	1	66.853	< 0.001
Copper	3	12.913	< 0.001
pCO ₂ × Copper	3	15.001	< 0.001
Car			
pCO ₂	1	60.415	< 0.001
Copper	3	14.894	< 0.001
pCO ₂ × Copper	3	7.666	0.002
Soluble carbohydrates			
pCO ₂	1	6.749	0.019
Copper	3	23.195	< 0.001
pCO ₂ × Copper	3	19.967	< 0.001
