

Interactive comment on “Ocean acidification and nutrient limitation synergistically reduce growth and photosynthetic performances of a green tide alga *Ulva linza*” by Guang Gao et al.

Anonymous Referee #4

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This manuscript details the results of a classical pCO₂ x Nutrients experiment with seaweeds. In that respect its novelty relays in the distinction between N and P limitation, while most of the phenomena concerning pCO₂ x N has been described before in *Ulva* sp. (eg. Gordillo et al. 2001 *Planta* and Gordillo et al. 2003 *Planta*).

Main comments

A major concern is about net photosynthesis. As it is measured (O₂ evolution), changes can derive either from photosynthesis or from respiration. Since respiration of seaweeds is commonly affected by pCO₂ (Iñiguez et al. 2015 *Polar Biol.*; Iñiguez et al. 2016 *Mar Biol*) even in *Ulva* (e.g. Gordillo et al. 2003 *Planta*) and also by nutrients,

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authors must show respiration rates along with the net or gross photosynthesis. Otherwise, not much can be said about the effect of pCO₂ and nutrients on photosynthetic O₂ evolution.

Line 304. The ‘pigment economy’ phenomenon occurring in algae at high pCO₂ was first described in Gordillo et al. (1999 *J appl. Phycol*) and described for *Ulva* using exactly the same name by Gordillo et al. 2003 (*Planta*), so credit must be given to those authors.

Minor comments Methods Incubation setup needs more detail. What type of recipient was used for adult thalli? At what density? Was the bubbling enough to make them move or were they settling on the bottom? Incubation light need more detail. What source of light was used (fluorescent tubes of daylight type?). Also how was the irradiance measured? (type of sensor, air or underwater?, lambda range?PAR?)

53. ‘also’ instead of ‘only’ 148-150. Sentence is nonsensical, please rephrase. 164. Units needed (nm)

Tables 4 to 7 can be combined and look like table 2, so the information is not scattered.

Fig.2. The horizontal bar means significant differences between LC and HC, but that is hard to believe for some of the treatment at least like LNHP in (a), and HNHP and LNHP in (b). Please check your post-hoc comparisons. It is also highly convenient you mention the number of replicates (n) in the figure legends.

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