

Interactive comment on “Effect of ocean acidification on the structure and fatty acid composition of a natural plankton community in the Baltic Sea” by J. R Bermúdez et al.

Anonymous Referee #1

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General comments

The paper is devoted to very important problem: an influence of elevated carbon dioxide concentrations on aquatic trophic chains, namely on food quality for consumers, regarded as content of PUFA in microalgae. Thereby, the paper is of potential interest for pure and applied aquatic ecology. An effect of elevated CO₂ on PUFA content in some microalgae has been demonstrated previously for laboratory cultures, and it is worth to test it in mesocosm studies for natural phytoplankton communities. The mesocosm experiments were well designed and the CO₂ levels, predicted by some future scenario, were used. Fatty acids were measured both in phytoplankton (seston) and in dominant zooplankton species. However, fatty acids in the work were represented as

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three groups only: SFA, MUFA and PUFA. To my mind, the group ‘PUFA’ is too coarse for the aim of study, namely for consideration of changing of food quality for consumers. Long-chain n-6 and n-3 PUFA act as physiological and biochemical counter-regulators in animals. To my mind, it is impossible to interpret a significance of their sum for animals’ status. Physiological role of 18C PUFA for animals is unclear. As a matter of fact, EPA (20:5n-3) and DHA (22:6n-3) are the indicators of nutritive quality for zooplankton, rather than sum of unspecified PUFA, used in this study. Even if the sum of PUFA in seston (phytoplankton) stay the same during CO₂ variations, it does not mean, that the nutritive quality for zooplankton also stays unchanged. For instance, decrease of 22:6n-3 vs. increase of 18:3n-3 in sum PUFA will decrease the nutritive quality for copepods. This can be due to a decrease of part of dynophytes vs. an increase of part of chlorophytes in phytoplankton (see Specific comments below). Hence, to my opinion, in the work an effect of the acidification on “fatty acid composition of a natural plankton community” was not studied, since fatty acid composition was not properly measured. Conclusion is irrelevant to results, obtained in the work, and resembles a mini-review of literature.

Specific comments

Page 5, line 149: Breteler et al. (1999) – should be Klein Breteler et al. (1999). Improve here and in Reference, line 347 - Klein Breteler W.C.M.

Page 5, line 167: (Breteler & Schouten, 1999) – is absent in Reference!

Pages 6-7, lines 207-211: the decrease of relative biomass of dynophyta and the concomitant increase of biomass of chlorophyta, to my mind, could result in decrease of content of 22:6n-3 and increase of 18:3n-3 in seston. However, using the coarse parameter ‘PUFA’ you had not an opportunity to see these changes in FA composition of zooplankton food, which likely significantly affected the nutritive quality of seston.