

***Interactive comment on* “Bacterial production and transformation of dissolved neutral sugars and amino acids in seawater” by L. Jørgensen et al.**

Anonymous Referee #2

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The authors report about a 32 day experiment in which they investigate the bacterial decomposition and formation of dissolved neutral carbohydrates (TDNS) and total hydrolysable amino acids (THAA) in artificial seawater and Atlantic and Arctic natural waters and amended with glucose. The results show a strong decomposition of TDNS at all conditions and that the mol% distribution at the end resembled that found in natural samples in many oceanic regions. TDAA were only slightly decomposed at the natural conditions whereas at the glucose-amended treatments there was little, if any, THAA decomposition and an increase in concentration after six days. The mol% distribution at the end deviated from that found in samples of other oceanic regions. The authors conclude that this experiment provides hints that in such a rapid time frame bacterial communities produce TDNS which are similar in composition to TDNS found in refractory DOM and attribute this finding to the active role of the microbial carbon pump. But

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this argument has little support from the data because the mol% of gal and glc of the glucose decomposition experiment are still far from that in natural marine DOM. The experiments and results are generally sound but I have several questions, suggestions and comments to further improve the manuscript. As expressed by another reviewer, my main general question is also what is new as compared to previous studies. Also Ogawa et al. (2001) used glucose as labile DOM source.

Abstract, l. 9: 32 days are not long-term, change wording Abstract, l. 10: It remains unclear here what kind of substrates or DOM sources were added. Mention the source of Arctic and Atlantic seawater here or even earlier. Abstract, l. 21: I am not sure of whether it makes sense to mention the microbial carbon pump here. We need to learn more about whether the concept of the microbial carbon pump really holds true and need to better understand it mechanistically. Further, your short incubation time seems not really long enough to make strong statements on the microbial carbon pump, except may be to THDS. p. 6155, l. 7: again, 32 days are not long-term compared to other studies of the Benner group. Please change. p. 6156, l. 1: write ample instead of ample. p. 6158, l. 8: I seriously doubt this assumption. When bacteria are flooded by a single carbon source this extreme situation must have consequences with respect to the release of sugars which are different from the natural situation. This point needs to be discussed, best on p. 6162, l. 25. p. 6164, l. 13-15: I think your interpretation and hypothesis here is going too far. The gal and glc mol% are still far off of that of natural (and possibly refractory) DOM. p. 6167, l. 26-27: I think that your data contribute only little to better understand the concept of the microbial carbon pump, may be with respect to a certain extent to the production of semi-labile AA due to the increase of the D/L-ratio. And 32 days are far too short to say anything to the microbial production of semi-refractory and refractory DOM. The concept of the microbial carbon pump tries to address the role of bacteria in generating semi-refractory and refractory DOM on a much longer time scale than your experiment. Table 1: second last row: provide the units of the bacterially produced sugars.

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