Biogeosciences Discuss., 11, C1895–C1897, 2014
www.biogeosciences-discuss.net/11/C1895/2014/

Biogeosciences
Discussions
Open Access

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

Anonymous Referee #1

Received and published: 27 May 2014

The authors explored the consumption and production of dissolved combined sugars and amino acids (mostly in biopolymers) in incubation experiments with bacteria and seawater (and artificial seawater) collected off the coast of Greenland. They deduced the production of combined sugars from differences between the glucose and control incubations. They weren't able to say much about combined amino acid production by bacteria. They found that the composition of the bacterially-produced combined sugars was similar to found in another study demonstrating the importance of bacteria (especially heterotrophic bacteria) in producing neutral sugars and other DOM components.

My main complaint about the paper is that it's not clear what's really new. The authors say that not much is known about the "microbial production of specific semi-labile and refractory biomolecules" , but then the rest of the introduction goes on to mention

several studies about this very topic (or so it seems). It's not clear how the authors can say much about truly refractory DOM with experiments lasting only 32 days.

I think the authors do have something novel to say, but the real unknowns have to be more clearly identified in the Introduction. That section also needs to review more carefully the previous studies doing incubations similar to what the authors did. What unknowns remain in spite of those previous incubation studies? How does this study differ from previous ones?

Specific comments

Title: "Bacterial production" usually means biomass production, so I suspect many readers will be confused by the title. The authors want to say "Production and transformation of dissolved neutral sugars and amino acids by bacteria. . ." And I wonder if "in seawater" could be replaced with something more informative.

P6152: Somewhere in the abstract, the authors should say where they did this experiment, i.e. the source of the water and bacterial community.

P6152, L13: Somewhere in the abstract, perhaps here, the authors have to say that the data presented here are about combined sugars and amino acids (mostly biopolymers), not the free forms. Some readers will assume the data are about free sugars and amino acids.

P6152, L24: How do these D/L ratios compared with ratios at time zero? Without something to compare, the numbers are meaningless to the non-D/L reader.

P6152, L22: Odd to see a reference to the microbial carbon pump here. It may be confusing to those not familiar with the term. Also, I'm not confused they can say much about the production of DOM that is part of the microbial carbon pump.

P6152, L23: "Long"? Thirty two days, the length of the incubations in this study, is not very long by many standards.

P6154, L25: Isn't it well known that bacteria and maybe archaea are both sources and sinks for D-amino acids? Maybe the lack of a consistent pattern is saying something different, not really about sources or sinks, but rather, perhaps, the balance between the two?

P6154, L27 and elsewhere: The authors talk about "Arctic" and "Atlantic" seawater, but in fact the samples were taken within a few (relatively speaking) kilometers from each other, in the Denmark Strait. I think calling one of these "Atlantic" is especially misleading. The two locations do differ, but the authors also sampled different depths. I suggest the authors come up with different simple labels for these samples. This isn't part of their main story, so there is no need to convince readers that they have representative samples from the Arctic and Atlantic.

P6155, L25: It was difficult to follow how the treatments were set up, perhaps because the authors mixed giving details about the methods with describing the treatments. I suggest having a clear statement about the treatments and about the bacterial inoculum (put that first, not after saying the "majoring of the seawater was filtered. . ."). Then follow up with more details about the types of filters, etc.

Table 1 and 2: Some of the most important pieces of data are the numbers given at the bottom of these otherwise boring (sorry) tables: the mol% of the bacterially-produced sugars and the composition after 32 days. Same for the amino acid data. These data deserve to be in their own table.

Interactive comment on Biogeosciences Discuss., 11, 6151, 2014.