

## ***Interactive comment on “Seasonal occurrence of anoxygenic photosynthesis in Tillari and Selaulim reservoirs, Western India” by S. Kurian et al.***

**C. M. Borrego (Referee)**

carles.borrego@udg.edu

Received and published: 11 January 2012

MS bgd-8-12153-2011 Kurian et al. Seasonal occurrence of anoxygenic photosynthesis in Tillari and Selaulim reservoirs, Western India

START OR REVIEW

The work by Kurian and co-workers describes the presence and dynamics of GSB populations in two Indian reservoirs through the analysis of several pigment biomarkers for these microorganisms (i.e. BChl e farnesyl-esterified homologs and isorenieratene). The work is interesting since it describes by first time the occurrence of these primary producers in these systems, providing estimations on their potential contribution to carbon fixation. In its present form, however, the manuscript contains several flaws and

C5235

errors that must be corrected prior to its final acceptance. Below I have included a list of comments and suggestions for improvement, which should be carefully considered by the authors.

GENERAL COMMENTS

- My first impression is that the authors have overstated the importance of their results. They should always remember that they have only analysed two reservoirs (and one of them was sampled only once!). These results may not be indicative for the rest of Indian reservoirs (whatever their number will be) and generalizations are risky, if not erroneous. The final sentence in the discussion section (although there are other examples throughout the MS) is clearly indicative of this: "...our studies reveal the importance of anoxygenic photosynthesis in Indian reservoirs during summer stratification." (Page 12168, Lines 10-11). Please, correct and be more cautious.

- The discussion section must be considerably reduced. In my opinion it contains several paragraphs that are not a proper discussion of results but only general information on GSB ecology and physiology. Most of these sentences must be placed in the introduction or completely removed. Other paragraphs are clearly speculative and should be avoided.

- In my opinion, authors have misidentified the three BChl e homologues found in their samples. BChl e1 ([E,M]BChl eF) is usually absent in natural populations and it is only clearly traceable in laboratory cultures grown under high light intensities (Borrego and Garcia-Gil 1994; 1995). According to my experience, the proper identification would be BChl e2, BChl e3 and BChl e4. This identification agrees with the typical homolog composition of brown-coloured GSB thriving under low light conditions in natural habitats (Borrego et al., 1997) and, especially, to the m/Z molecular masses obtained by the authors (caption to Figure 4) and listed in previous works (Airs et al., 2001, Photosynth. Res. 70: 221-230; Glaeser et al., 2002, Arch. Microbiol. 177: 475-485). A simple comparison of these values yields the correct identification: BChl e2 (wrongly

C5236

identified as e1 in the text) = [E,E]BChl eF (m/z = 821.5); BChl e3 (wrongly identified as e2 in the text) = [P,E]BChl eF (m/z = 835.5); and BChl e4 (wrongly identified as e3 in the text) = [E,E]BChl eF (m/z = 849.5). The correct m/z for BChl e1 = [E,M]BChl eF is 807-809 (Airs et al., 2001; Glaeser et al., 2002) is clearly below the masses of the homologues identified by the authors. Please correct throughout the manuscript and figures.

- Some references cited in the text are not in the final list (see specific comments below).

- I suggest redrawing some of the Figures for better visualization/readability (see specific comments below).

- Although the MS is well written and understandable, authors should carefully check English language to avoid colloquial expressions and confusing sentence structures.

#### SPECIFIC COMMENTS

##### Abstract

Page 12154, Line 15: Replace "computed" by "estimated". Please provide conversion factors in M&M section.

P12154, L17-18: The sentence "These results highlight the importance..." clearly overstate the results (see previous comment). Please correct and be modest.

P12154, L23: Replace "noted" by "detected"

##### Introduction

P12155, L16-17: None of these works used LC-MS. Please, correct.

P12155, L20: Replace "brown coloured ones" by "brown-coloured species"

P12156, L8: Reference by Narvenkar et al. 2011 is not in the final list.

P12155, L18: Reference by Shenoy et al., 2011 is not in the final list.

C5237

##### Material and Methods

P12158, L5: The wavelengths used for detection (450 and 665 nm) correspond to the Soret and Qy bands of bacteriochlorophylls not to the excitation and emission since the authors used a PDA detector not a fluorescence one. Am I right?

P12159, L16: Please provide a valid reference for the Pfennig medium not the web address of the DSMZ!

P12159, L18: Replace "served" by "added"/"fed"

P12159, L18: "... and other supplements..." is vague. Please, specify which were these "other supplements" and their final concentrations in the culture medium.

P12159, L20: "...confirming the enrichment of the culture in GSB species".

##### Results

P12160, L5: "shoaled"? I don't understand the meaning here? Do you mean that the oxic/anoxic layer moved upward? Please, specify and correct if appropriate.

P12160, L21: The misidentification of BChl e homologs is a major issue to be corrected (see general comments above).

##### Discussion

P12162, L15: The whole discussion section must be shortened (see general comments above).

P12165, Lines 14-29: The entire paragraph is clearly not a discussion of your results but some sort of review of results from other authors. Please, rewrite using only the information useful to discuss your results in a theoretical context. Also, "isorenieratene" is misspelled in this paragraph and below (isoreneiratene). Please, correct.

P12167, L3: I think that it is probably better to integrate the BChl e concentration only in the anoxic compartment not from the surface to the bottom. I suggest recalculating

C5238

these integrated values.

P12167, L10: "admittedly imprecise" is colloquial. Please, correct.

P12167, L20-22: In this context "plant" Chl a is not appropriate, use "algal" instead.

P12167, L23: ...chlorophyll concentrations not "levels".

P12167, L25: Reference by Narvenkar et al. 2011 is not in the final list.

P12168, L24: "in a larger water compartment from 11 to 45 m depth..."

P12168, L5: "Previous studies showed that..."

P12168, L5: "microorganisms" delete the extra space.

P12168, L11: The final sentence is a clear overestimation of the results (see general comments).

#### References

- Please review the reference list carefully. Reference must be cited in alphabetical order of the first author and then chronologically (correct the final set of references by Yacobi that are not chronologically sorted).

#### Figures

- Figures 2 and 3. Some issues must be addressed, namely:

- Figs. 2A/3A: Units for Dissolved Oxygen should be mg/l not ml/l. Am I right? If so it must be corrected in both the axis and the caption.

- Figs. 2B/3B. I suggest plotting the total concentration of BChl e (e2+e3+e4) since the individual homolog concentration does not provide any extra information using this type of plot. If the authors consider that the homolog composition of the population is an important issue to emphasize (as I believe), I suggest plotting the individual concentrations of homologs (or their relative abundance, in %, -probably better-) in a vertical bar

C5239

plot comparing different dates for Tillari reservoir (2B and 3B) and Selaulim reservoir (6B).

- Figure 3C

- I suggest plotting light intensity in a logarithmic axis. In its present form the light extinction along depth is hardly visible, especially the change in light extinction (change in the slope of the curve) caused by the GSB population.

- Figure 4: The identification of BChl e homologs is erroneous. Please, correct according to comments above.

- Figure 6: Same comments for 6A and 6B than those listed above for Figures 2 and 3.

END OF REVIEW

---

Interactive comment on Biogeosciences Discuss., 8, 12153, 2011.

C5240