Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2018-370-RC2, 2018

Biogeosciences
Discussions

Interactive comment on "Pyrite oxidization accelerates bacterial carbon sequestration in copper mine tailings Type of contribution" *by* Yang Li et al.

Anonymous Referee #2

Received and published: 18 September 2018

The manuscript explored the autotrophic microbes and the FeS2 facilitation role in acidic mine tailings using stable isotope and molecular methods. The results showed that FeS2 facilitated CO2-fixing by microbes and increased the abundances of relevant autotrophs. The study is very interesting, which could provide new insights into the autotrophic roles in extreme environments. However, the article writing is awful in logic, result description and interpretation. Here are my concerns: 1 The introduction did not show some key points relevant to the research, such as possible CO2-fixing pathways and autotrophs in acidic sulfur-enriched environments. The introduction was not well structured and really needs rewrite. 2 The method section failed to describe key details: 1) weather the samples were washed by acid prior to measuring isotope compositions?

2) no descriptions on chemical analysis in samples, i.e. solutes for Fe2+,Fe3+, SO42- .... 3) no citations for the primer sets, which were apparrently designed in the study 4) no informations on PCR reactions 5) how did the authors determine the PCR efficiency? 6) how did the authors qualify gene abundance? standard curves? 7) no statistic software informations 8) how many replicates were for each treatment? 3 Fig1 symbols are very confusing, and no descriptions on the above and bottom columns. 4 No specific legends or descriptions on the two inserts in Fig. 3, and the color differences are not clear. 5 L252-261, 284-291, there are many super long sentences. A sentence usually contains maximum 22 words. 6 The CO2-fixing capacity by autotrophs should be calculated. 7 L306-307, the statement is problematic: 12CO2 is a control relative to 13CO2, so the shift to heavy fractions should not be observed in 12CO2. 8 L307-311, the statements are not correct: for the peak in 13CO2 occurred in the density of 1.72 rather than 1.73 in both 12CO2 and 13CO2. 9 L311-314, the statements should go to discussion section. 10 Fig. 6, Cultured genus most related to OTU1, 2, 3 and 4 should be given for identifying purpose. 11 cbb is not a correct gene name, it should be cbbL or cbbM. 12 Is Fig. 5 for FeS2 treatments or raw mine tailings? 13 L351-371, the paragraph should go to introduction section. 14 The discussion is far from the results, i.e. discuss why and how FeS2 facilitates microbial CO2-fixing and changes the whole bacterial community.

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