

Biogeosciences Discuss., referee comment RC1
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Comment on bg-2022-232

Anonymous Referee #1

Referee comment on "Impact of metabolism and temperature on 2H/1H fractionation in lipids of marine bacterium *Shewanella piezotolerans* WP3" by Xin Chen et al.,
Biogeosciences Discuss., <https://doi.org/10.5194/bg-2022-232-RC1>, 2023

I have carefully read the paper entitled "" by Chen et al. The authors studied the controls on hydrogen isotope fractionation between fatty acids and growth water by a Fe-reducing heterotrophic marine bacterium *Shewanella piezotolerans* WP3. The authors also evaluated the impact of growth temperature on hydrogen isotope fractionations. Given the potential of hydrogen isotopes as a proxy in the geological records, more studies on factors controlling hydrogen fractionation bacteria are needed. The cultures are reasonable, the data are sound and suitable for publication on Biogeosciences after minor revisions. My main concern is that the biomarker compositions are different when supplied with different substrates or temperatures, the authors need to address the reasons and if those reasons influence the hydrogen isotope fractionation as well. Although the manuscript is overall well written, the language is needed to be polished further.

Minor errors as follow:

Line 172, branched chain lengths can be saturated fatty acids, too. If you mean to highlight branched chain lengths, you need to say "compared to straight chain lengths". The authors compared the hydrogen isotopes of iC15 and aiC15 with C16 and conclude different precursors make different hydrogen fractionations, the authors need to clarify who are their precursors and what pathways they used to produce these fatty acids.

Since the $\delta^2\text{H}$ values are closely related to the NADPH to NADH, is it possible to determine the $\delta^2\text{H}$ values of NADPH to NADH? Especially supply different bacteria with the same substrates.

Line 101,described in Rodríguez-Ruiz et al. (1998).

Line 281, relatively larger