

## ***Interactive comment on “Release of hydrogen peroxide and antioxidant by the coral *Stylophora pistillata* to its external milieu” by R. Armoza-Zvuloni and Y. Shaked***

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Given my interest in the biogeochemistry of reactive oxygen species (ROS) in seawater, I was invited by Dr Shaked to comment on this submission to BGD. I wish to disclose that Dr Shaked and I coauthored a Perspectives article on ROS in seawater recently, although we have not otherwise closely collaborated and I have not been involved in the work presented in this current manuscript in any way.

Overall I found the paper to be a valuable contribution to our knowledge of the dynamics of biological production and decay of hydrogen peroxide in seawater. In particular, I think that the approach of considering kinetics of hydrogen peroxide formation

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and decay at naturally occurring (nanomolar) concentrations using measurements with high temporal resolution but over relatively long timescales is a significant advance towards understanding these processes under environmentally representative conditions. I think that this approach will be useful for a range of future studies in this area.

The paper additionally offers intriguing new insights into the nature of hydrogen peroxide formation, release and decay in corals, and the potential roles of the coral polyp and algal symbiont in these processes. The paper raises many questions in this regard and offers only speculative answers to some, but given the novelty of this approach and the new insights offered, I think that the overall benefit to publishing this work certainly outweighs the uncertainty.

Having submitted this comment relatively late in the discussion period, I am fortunate to have the ability to read and reflect on this comments already posted by others. I agree with many of the criticisms made by other reviewers of this work, and I believe that attempts to address these criticisms would greatly strengthen the paper. In particular:

- I agree that use of the term “antioxidant” is ill-defined and not the most appropriate term; as anonymous reviewer #2 suggests, H<sub>2</sub>O<sub>2</sub> degradation would seem a more accurate description of the process.

- I also found the methods description to be inadequate in several cases, as discussed by both anonymous reviewers. I believe that the methods themselves are appropriate for the study, but the clarity of presentation could be greatly improved by additional details.

- If at all possible, a more quantitative description of stirrer speeds (and potentially some calculations of associated mass transport rates) could really improve the paper. For example, calculation of mass transport rates of hydrogen peroxide might allow a more quantitative test of the proposition that stirring promotes release of hydrogen peroxide from some kind of intracellular “pool”, which is a relatively contentious idea as noted by anonymous reviewer #1.

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In summary, I enjoyed reading this paper and think it offers several novel insights that will advance our understanding of the behaviour of ROS (and particularly the interactions between corals and ROS) in seawater, but with a few relatively minor modifications has the potential to make an even stronger contribution.

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