

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2021-137

Anonymous Referee #2

Referee comment on "Revisiting the reaction of dicarbonyls in aerosol proxy solutions containing ammonia: the case of butenedial" by Jack C. Hensley et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-137-RC2>, 2021

General comments:

This manuscript describes results from an analysis of the reactions that can occur for butenedial in aqueous solution as a function of pH and as a function of NH_x concentration. The chemical changes were tracked with NMR combined with some MS to help identify products and a chemical scheme along with reaction kinetics are provided. Overall, this work demonstrates the need for additional studies on different types of dicarbonyls that are atmospherically relevant as the behavior of butenedial does not follow what would be predicted based on prior studies of α -dicarbonyls like glyoxal and methylglyoxal. This is a well written and clear study that builds on prior work. I would recommend acceptance in ACP after the following minor comments are addressed:

Minor comments:

- The accretion products from butenedial/ OH^- were observed to be brown immediately, and a portion of the MS is provided for the samples (figure S4). Were there any nitrogen containing peaks observed to form in this sample in the other mass ranges? I am concerned about trace ammonia from the room since very small concentrations would be needed if the chromophores have a large absorption cross section.
- The concentration ranges here were reasonably high, what do these concentration ranges correspond to in the atmosphere? There is some discussion about rainwater in India, given the much lower concentrations for organics that can be found in rainwater, would the authors expect to see the same types of chemistry?
- On page 7, it is stated that the ^1H -NMR spectra shows a buildup of signal in the baseline which increases and spreads out with respect to the chemical shift over time.

With the data overlaid and colored the way it is, this is very difficult to see in the figure. Also in Figure S5, there is a note that there are two expanded regions, but these are not shown in the figure.

- The numerical values for the last few supplemental figures appear to be off in the manuscript (there is no Figure S16).