

Atmos. Chem. Phys. Discuss., referee comment RC1  
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## Comment on acp-2021-1049

Anonymous Referee #1

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Referee comment on "Distribution and stable carbon isotopic composition of dicarboxylic acids, ketocarboxylic acids and  $\alpha$ -dicarbonyls in fresh and aged biomass burning aerosols" by Minxia Shen et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-1049-RC1>, 2022

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This work studied the dicarboxylic acids (diacids) and related compounds from fresh and aged biomass burning (BB) source samples. The emission factors of each diacid and their carbon isotopic ratios were also calculated, which suggested the secondary formation nature of oxalic acid and related species. This work presents some interesting results given the uncertainty of direct emission of diacids from BB source samples. However, several issues need to be clarified before the consideration of acceptance.

- The major concern is the setup of aging experiments of source samples in the chamber. Two and seven days are quite long for the oxidation of organics to diacids under high loadings of oxidant. Although authors had cited two references to support this setup, the detailed conversions from VOCs to oxalic acid were almost completed in two days from the ratios of 50.8 and 64.5 given in this work, so authors need to clarify this issue.
- Authors need to explain more clearly why the direct measurement of diacids from fresh BB samples is so important in the introduction in lines 83-86.
- Authors said "investigate reactions of volatile organic carbon compounds (VOCs) with oxalic acid and intermediates that form in the aging process" is one of the aims of this work. However, the detailed compositions and abundances of VOCs were not presented in the paper, and the supporting evidences were mainly from linear regressions between the reduction of VOCs and increase of oxalic acid. This was insufficient to give such important conclusion.
- How do you set the RH in the chamber study?

Minor comments:

- Line 230-231: rewrite.
- Line 232: "This also is a likely reason", grammatical error.
- Line 251-252: the "rapid" is contradictory to the description in lines 250-251.
- Line 292: "photochemically oxidization rune pronounced". I can't understand.
- Line 327: "reported the a heaviest", rewrite.