

***Interactive comment on “Measurement report:
Amino acids in fine and coarse atmospheric
aerosol: concentrations, compositions, sources
and possible bacterial degradation state” by
Ren-guo Zhu et al.***

Anonymous Referee #2

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The manuscript entitled “Measurement report: Amino acids in fine and coarse atmospheric aerosol: concentrations, compositions, sources and possible bacterial degradation state” by Zhu et al. shows the measurement of combined amino acids in fine ($<2.5\ \mu\text{m}$) and coarse ($>2.5\ \mu\text{m}$) aerosol particles. The isotopic ratios of ^{15}N of individual amino acids were obtained and studied for source investigation. The degradation of microbiomes especially bacterial were discussed. The results are very interesting and should be suitable for publication in the journal. I also found that the manuscript was not very well prepared at the current stage and many parts could (and should) be

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clarified before being considered for publication.

The title should be revised. Firstly, it is strange to mention “measurement report”, isn’t it? Is it really necessary? Secondly, “combined amino acids” should be clear. Otherwise, it may refer to free amino acids.

The application of isotopic ratios of stable nitrogen and degradation index would be very interesting for source investigation. In this work, the author may think about what they would really like to focus on and why they are important. The current manuscript contains data from observation and measurement but I feel it is a bit ambiguous on their conclusions. The Abstract could also be improved in order to present and show the main idea of this manuscript. By the way, isotopic ratio is a nice and promising tool for understanding the sources of combined amino acids but please note that the influence of atmospheric processes may affect the fractionation. The authors should also explain more of the connection between DI and bacterial degradation (especially in Section 4.2). At least for me, I could not really understand why? If I understood it correctly, amino acids were hydrolyzed and might present the composition of proteins. How could DI be used to estimate the bacterial degradation? The variation of DI may present the degree of aging but how to relate it to bacterial degradation?

The discussion in 4.1 leads to the conclusion that the sources of amino acids are somehow identical between fine and coarse particles. The question may come to the point of more degradation in coarse particle. If degradation is important for amino acids, some difference of composition profile or source contribution should be found between fine and coarse particles. The other possibility is that the support of $\delta^{15}\text{N}$ may not be sufficient in this case. PCA was used in this study. Why not putting more chemical species and organic tracers in the PCA analysis as many studies did? These amino acids were combined and should how could they contributed from different sources?

The discussion on the release of coarse “fresh” bioparticles at the onset of rainfall seems arbitrary and could be clarified with the support of precipitation data (how long

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and how strong the rain happened). As is known, rainfall may promote the release of bioaerosols but it also depends on the frequency and intensity. In most cases, it occurs mainly in a much shorter time scale. The rainfall then could suppress the concentrations of bioaerosols in the air. The sampling was daily based in this study and it may not be very well to observe this variation in my personal opinion.

The part of Results contains many short sub-sections which is not very friendly for the readers. These sub-sections only repeat the Table and Figures, making it very hard to follow. Please re-arrange it. Why not put results and discussion together?

I would suggest the authors to select and keep some nice figures and move some to the supporting file. It may help to make the manuscript clear and concise.

Fig. 1 and Fig. 3: The information of fine/coarse particles is missing. I was confused by them and had to search which data belong to fine/coarse particles.

Minor mistakes/errors: Seems quite many minor mistakes/errors throughout the text. Please check through. For example: L24: “ $p < 0.0.1$ ” should be “ $p < 0.1$ ” L47: “allergy” should be “allergenicity”? L141: “PCi” should be deleted? I suggest to introduce more information of DI. L146: Rstandard should be described here. L159: Please check the formula. It seems wrong. L291: “Compared our calculating method with other works”? comparing the results or comparing the method?

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