

Reply on RC1

The authors have explained the general background and previous research on the topic well. However, the last paragraph of introduction are results from the study and should be moved to results and discussion. The aims of the study are not clearly stated and should be included in the introduction section. In the results section, it was sometimes hard to differentiate what was literature review and what were the new results reported by the authors.

- Add details for choosing these 15 strains

Answer: Thank you for your good suggestion. The 15 strains, which include bacteria, mold and yeast, are representative. The bacteria included both Gram-positive and Gram-negative bacteria, and included common shapes such as balls and rods. We have added the types of bioaerosols in Table 1.

- State the reasons for choosing blood agar and the incubation periods for both bacteria and fungi. Fungi often takes longer to grow in agar compared to bacteria.

Answer: This is really a very professional question, thank you very much. Blood plate medium is rich in nutrients, which can meet the growth requirements of strains and facilitate the separation of samples. The streaking bacterial medium was placed horizontally in a 37°C incubator for 18-24h, and the fungal medium was placed horizontally in a 25°C incubator for 36-48h. We have supplemented the section in sample preparation.

- In section 3.1, how did the authors determine if the biological particles were single cells or clumps?

Answer: This is really a very professional question, thank you very much. Single particle aerosol mass spectrometry is a technique in which the particle size is obtained by converting the velocity of particles measured by double-beam diameters to the calibration curve measured by standard monodisperse PSLs pellets. By strictly controlling the injection concentration of bioaerosol to 80±10 per second, the phenomenon of "particle catch-up" caused by excessive aerosol concentration was excluded. And the best way to ensure the existence of single-cell particles is to generate bioaerosol through nebulizer. We compared the size distributions of the bioaerosols detected by HP-SPAMS with those obtained by electron microscopy. HP-SPAMS, like all single-particle mass spectrometers have size-dependent counting biases in the range of 10% compared with electron microscopic measurements (for example E. coli). But there is no guarantee that all the particles tested will be single cells.

- Is it probable to add bioaerosols to fig 4 ?

Answer: Thank you for your good suggestion. We added bioaerosols in Fig.4 to better compare the ion signals of the four types of particles in organic nitrogen and phosphate.

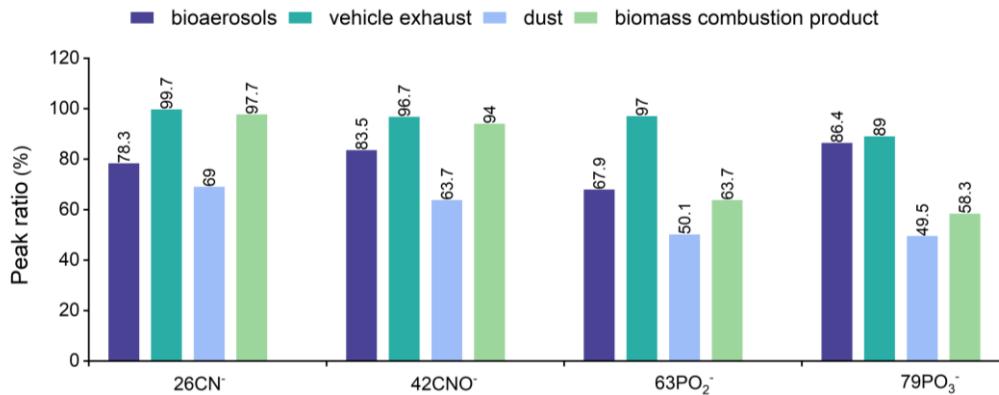


Fig. 4 Comparison of the frequency of four ion peaks in abiotic aerosols

- Table 2 reports only average. It would be more informational with average \pm SD

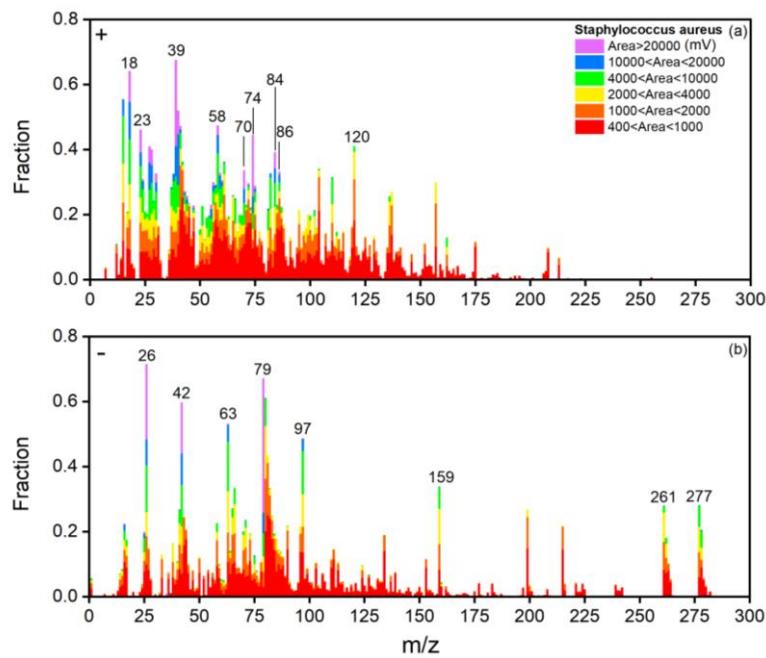
Answer: Thank you for your suggestion. To provide more specific information, we supplement average \pm SD in Table 2.

Table 2 The average frequency of the characteristic ionic peak of bioaerosol

Species	CN ⁻	CNO ⁻	PO ₂ ⁻	PO ₃ ⁻
Bacteria	92.9 \pm 1.8%	96.5 \pm 1.1%	82.9 \pm 5.0%	97.6 \pm 2.5%
Fungi	63.8 \pm 21.1%	70.4 \pm 21.3%	52.8 \pm 18.5%	75.3 \pm 26.6%

- In section 3.4, how representative is *S. aureus* for all bioaerosols? The authors could add a representative fungus or a mixture of bacteria and fungi.

Answer: Thank you for your good suggestion. *Staphylococcus aureus* is widely found in the nature environment. The characteristics of the 15 strains were analyzed by mass spectrometry, and the similarity between the strains was very high. The characteristics of *S. aureus* spectra are highly consistent with the measured all bioaerosols characteristics and have certain representativeness.



- Page 4 – The tense is inconsistent for sample determination section.

Answer: Thanks. It has been corrected.

- Line 195 – Serine and alanine needs to be formatted.

Answer: Thanks. We have made the formatting changes.

- Table 2 – Species “Fungus” is singular. I believe the authors are referring to a group of fungi.

Answer: Thank you, and “Fungus” has been changed into “Fungi”.