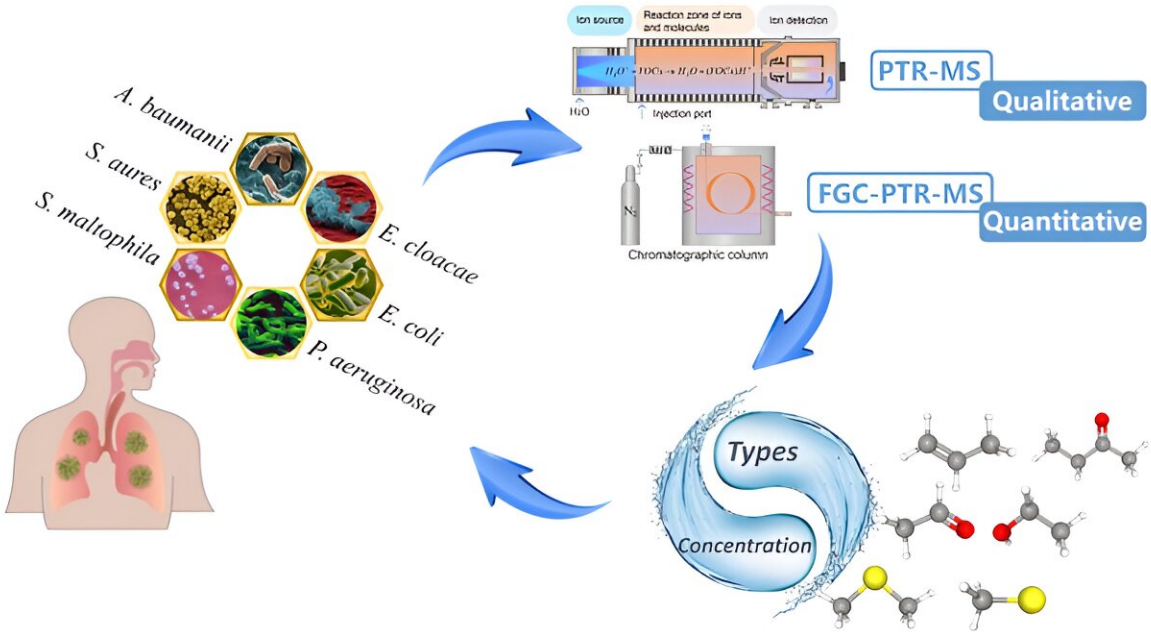
Sniffing out bacteria: Team develops a novel approach for rapid bacterial species identification

March 26 2024



Schematic diagram of experimental process and results. Credit: Xu Wei

Do you ever wonder how researchers identify bacterial infections? Traditionally, they collect samples from the infected site, grow the bacteria in a lab, and analyze them using a method called MALDI-ToF-MS. Although accurate, this method is time-consuming, with a detection

process that takes 1-3 days.

A research team from Hefei Institutes of Physical Science of Chinese Academy of Sciences has come up with a faster solution. The work is published in *Analyst*.

The researchers developed a method using proton transfer reaction-mass spectrometry (PTR-MS) and fast gas chromatography-proton transfer reaction-mass spectrometry (FGC-PTR-MS) to detect volatile organic compounds (VOCs) emitted by 6 types of bacteria.

"We found each type of bacteria has its own unique smell," said Prof. Shen Chengyin, who led the team. "This can be used for rapid identification of bacterial species."

The team focused on common pathogenic bacteria in patients with ventilator-associated pneumonia (VAP), a typical respiratory infection. The bacteria were rapidly detected using PTR-MS after cultivation, and characteristic ions were qualitatively analyzed using FGC-PTR-MS.

The experimental results indicate that after three hours of quantitative cultivation, the VOCs released by six bacteria can differentiate, and utilizing these differentiated VOCs enables significant differentiation of bacterial strains. This research demonstrates the feasibility of rapidly identifying bacterial strains through bacterial VOCs.

"We hope that the relevant technologies can help doctors formulate treatment plans promptly and enhance patient survival rates." said Dr. Xu Wei, first author of the paper.

More information: Wei Xu et al, Qualitative and quantitative rapid

detection of VOCs differentially released by VAP-associated bacteria using PTR-MS and FGC-PTR-MS, *Analyst* (2024). DOI: 10.1039/D3AN02011H

Provided by Hefei Institutes of Physical Science, Chinese Academy of Sciences

Citation: Sniffing out bacteria: Team develops a novel approach for rapid bacterial species identification (2024, March 26) retrieved 27 April 2024 from https://phys.org/news/2024-03-sniffing-bacteria-team-approach-rapid.html