Detection of drug and its metabolite in fingerprint by SALDI mass spectrometry using zeolite and study of time-dependent changes in detected ion amount

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The ingredients in AAP tablet and their metabolites excreted into fingerprints were detected by SALDI mass spectrometry using α-cyano-4-hydroxycinnamic acid (CHCA) adsorbed on a zeolite surface (HM20). Fingerprints were collected from multiple volunteers who ingested commercially available AAP tablet due to such symptoms as headache. All volunteers took the same tablet composed mainly of acetaminophen (AAP), ethenzamide (Eth), and caffeine (Caf). In the fingerprint taken 4 hours after ingestion, AAP, Caf, and Eth were detected as proton adducted ions. Glucuronic acid conjugate of AAP (GAAP) and salicylamide (Sala; a metabolite of Eth) were also detected as the metabolites of AAP and Eth, respectively. Fingerprints were collected over time to determine how the amounts of drug and its metabolite change with time, and the time dependence of the peak intensities of protonated AAP and GAAP was measured. It was found that the increase of $[GAAP+H]^+$ peak started later than that of $[AAP+H]^+$ peak, reflecting the metabolism of AAP. It was also found that both AAP and GAAP reached maximum concentrations approximately 3 hours after ingestion, and were excreted from the body with a half-life of approximately 3.3 hours; k_{decay} was 0.32 ± 0.14 and 0.33 ± 2.6 for AAP and GAAP, respectively. In addition, the application CHCA/HM20 on fingerprint enabled fingerprint preservation, as confirmed by optical microscopy. The fingerprint shape could be sufficiently retained without being destroyed by laser irradiation for 1 minute under our experimental conditions. Our method may be used in fingerprint analysis[1].

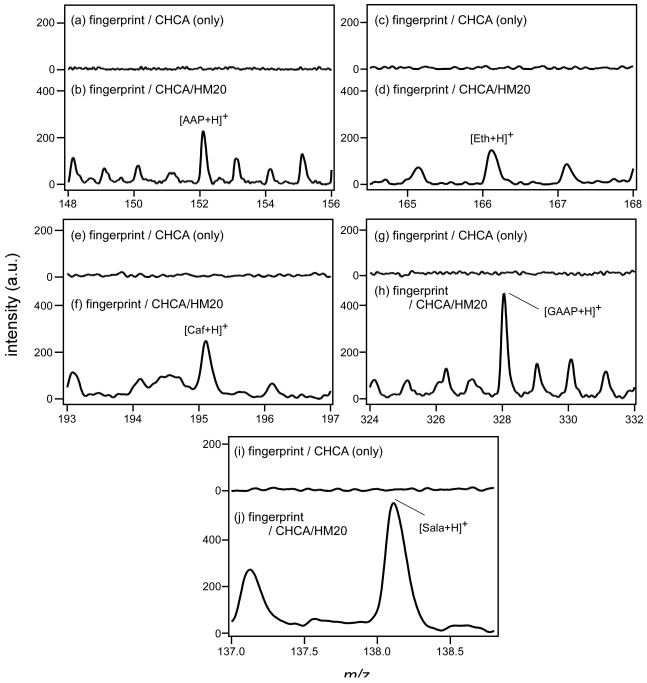

Fig. SALDI mass spectra of fingerprint taken 4 hours after ingesting AAP tablet.

References:

[1] T. Horikoshi, C. Kitaoka, T. Asano, J. Xu, T. Fujino, *Analytica* **2** 66 (2021).