

Abstract

Sweat-Based Volatile Organic Compound Identification of SARS-CoV-2 Detection [†]

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Due to an outbreak of COVID-19 pandemic in recent years, the emerging variants of SARS-CoV-2 causing diagnostic challenges. The rapid, non-invasive diagnostic is an urgent need to differentiate between infected with asymptomatic or symptomatic individuals and uninfected with COVID-19 to control the silent virus spreading in the community. This research developed alternative method of detecting COVID-19, in these approaches mainly focused on volatile organic compound (VOCs) in armpit sweat samples derived from population in Thailand, during variants occurring between April 2021 to May 2023, including Delta and Omicron BA.1/BA.2. VOCs odor emission produced in response to inflammation and infection from SARS-CoV-2 infection body by Gerstel Multi-purpose sampler, headspace solid-phase microextraction coupled with gas chromatography-mass spectrometry (HS-SPME/GC-MS) technique with the total of 150 collected sweat samples with 75 negative confirmed COVID-19 and 75 positive confirmed COVID-19 cases (asymptomatic/symptomatic) used to identified potential biomarkers for COVID-19 related with peak areas of chromatogram results. The statistical analysis of ROC curves including classification rate indices of sensitivity, specificity and accuracy of the different potential markers for armpit sweat samples in GC-MS allowed potential VOCs biomarkers to discriminate the COVID-19 patients as nonanal and aromatic compounds (up to 92% sensitivity, 97% selectivity, and 96% specificity), respectively, and validated the results by comparison with the RT-PCR gold standard technique.

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