

Detection of SARS-CoV-2 in nasal swabs using MALDI-MS

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Detection of SARS-CoV-2 using RT-PCR and other advanced methods can achieve high accuracy. However, their application is limited in countries that lack sufficient resources to handle large-scale testing during the COVID-19 pandemic. Here, we describe a method to detect SARS-CoV-2 in nasal swabs using matrix-assisted laser desorption/ionization mass spectrometry (MALDI-MS) and machine learning analysis. This approach uses equipment and expertise commonly found in clinical laboratories in developing countries. We obtained mass spectra from a total of 362 samples (211 SARS-CoV-2-positive and 151 negative by RT-PCR) without prior sample preparation from three different laboratories. We tested two feature selection methods and six machine learning approaches to identify the top performing analysis approaches and determine the accuracy of SARS-CoV-2 detection. The support vector machine model provided the highest accuracy (93.9%), with 7% false positives and 5% false negatives. Our results suggest that MALDI-MS and machine learning analysis can be used to reliably detect SARS-CoV-2 in nasal swab samples. © 2020, The Author(s), under exclusive licence to Springer Nature America, Inc.