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SERS & AI, an innovative combination for Virus Detection

The world's history of SARS-CoV-2 pandemics has shown the need to adapt our pathogen detection technologies. Current detecting tools are indeed insufficient to face the flood of samples. As it requires a long time, many reagents and qualified personnel, RT-qPCR is not adapted when facing the need for rapid detection of a pathogen and laboratories often found themselves overloaded.

Surface Enhanced Raman Spectroscopy (SERS) has been described as a good detection tool for pathogens analysis, such as viruses or bacteria (1-3). This technique uses monochromatic light to excite a sample and get a spectral fingerprint signal in a matter of seconds.

Spectra obtained by SERS give a complete and complex fingerprint of the sample analyzed. Chemometrics and data science are here used to treat these signals to give a ultra-fast interpretation. We defined a protocol that combines SERS and AI to detect multiple viruses in order to bring an innovative and efficient technology for pathogen detection.

References

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- [2] M. Chisanga et al., *Applied Sciences*, vol. 9, no 6, Art. no 6, janv. 2019
- [3] C.-C. Andrei et al., *Anal Bioanal Chem*, vol. 413, no 5, p. 1417-1428, févr. 2021

Figures

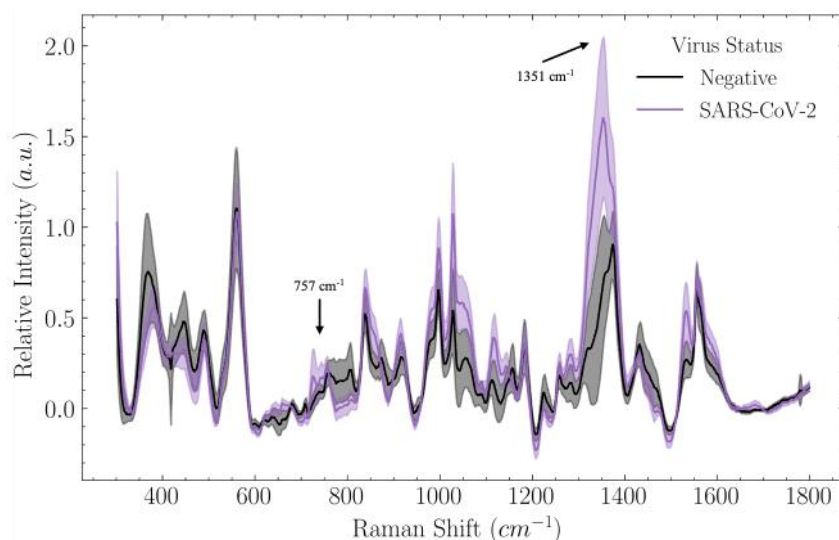


Figure 1: SERS mean spectra with standard deviation of coronavirus SARS-CoV-2 (purple) and negative (black) samples after preprocessing with SNV and ALS.