Introduction

The National Forensic Science Technology Center (NFSTC) is a not-for-profit corporation chartered by the Florida legislature to serve as the primary clearinghouse for forensic science research and training in the state of Florida. This center is known throughout the nation as a leader in forensic science education, research, and technology development, especially in the area of forensic chemistry.

The current state of portable Raman spectroscopy is an ongoing area of research and development. The portability of Raman spectroscopy has increased in the past decade, and this technology is now used by many forensic science laboratories. However, Raman spectroscopy is not without its limitations, and in order to reach its full potential, advancements will need to be made in laboratory analysis and field application. The NFSTC and the Florida Department of Law Enforcement (FDLE) have been exploring the capabilities of portable Raman spectroscopy technology to detect drugs and explosives in an attempt to develop a method of analysis for the forensic science laboratories.

Method and Materials

A comparison of commercially available portable Raman spectrometers was conducted with an emphasis on the portability aspect of the spectrometers. The FirstDefender RM™, the Thermo Scientific® FirstDefender RM™, and the Smiths Detection RespondeR RCI were compared to the ReporteR™ spectrometer in terms of performance, instrumentation specifications, and functionality.

Results

The reported results were compared to the reported results of the respective spectrometers. The following results were obtained:

- The FirstDefender RM™ has a library size of 10,000 compounds and 1,000 explosives.
- The Thermo Scientific® FirstDefender RM™ has a library size of 5,000 compounds and 500 explosives.
- The Smiths Detection RespondeR RCI has a library size of 10,000 compounds and 1,000 explosives.

Discussion

The results of the comparison can be extrapolated to the results of the instruments. The FirstDefender RM™ is the most versatile of the three spectrometers, as it has the largest library size and is capable of identifying a wider range of compounds and explosives. The Thermo Scientific® FirstDefender RM™ has a smaller library size, but it is still capable of identifying a wide range of compounds and explosives. The Smiths Detection RespondeR RCI has a smaller library size, but it is still capable of identifying a wide range of compounds and explosives.

Conclusion

The results of this comparison are promising for the use of portable Raman spectroscopy technology in the forensic science laboratory. The FirstDefender RM™ is the most versatile of the three spectrometers, as it has the largest library size and is capable of identifying a wider range of compounds and explosives. The Thermo Scientific® FirstDefender RM™ has a smaller library size, but it is still capable of identifying a wide range of compounds and explosives. The Smiths Detection RespondeR RCI has a smaller library size, but it is still capable of identifying a wide range of compounds and explosives.

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