Application Note RAD004

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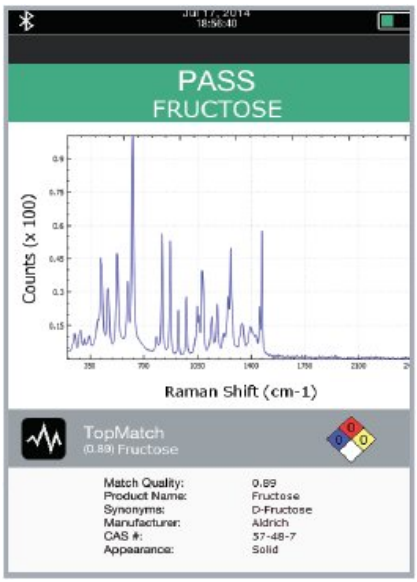
RAD004 - Analysis of dietary supplements, nutraceuticals, and their raw materials

Introduction



Under 21 CFR part 111, dietary supplement manufacturers are required to use at least one appropriate test method to verify the identity of any component or excipient used in the manufacturing of a dietary supplement. Manufacturers are also required to confirm identity of all components to determine if applicable specifications are met.

- Improved quality control
- Increased production efficiency
- Raw material identification (RMID)

Quick raw material authentication

In the past, identification methods have relied on subjective organoleptic testing and/or time-consuming and sometimes expensive laboratory analysis. In recent years handheld Raman has been shown to be a valuable tool for quick objective identification of raw materials in regulated industries and is a recognized technique by the U.S Pharmacopoeia (USP) and the European Pharmacopoeia (EP). Handheld Raman has the specificity to identify and distinguish a wide range of dietary supplement ingredients and the portability and simplicity to perform the analysis outside the laboratory where it can be done more efficiently. Handheld Raman can analyze many types of vitamins, minerals, inorganics, amino acids, extracts,

some herbals and some botanicals. Figure 1 shows three examples of Raman spectra of dietary supplement ingredients. The fact that each material has a different pattern of peaks is what allows Raman spectroscopy to identify the different materials.

Minimize sample interference / maximize efficiency

With the introduction of Rigaku's Progeny handheld, long wavelength 1064 nm analyzer, many materials that cannot be measured using handheld Raman with 785 nm excitation are now possible. To demonstrate the advantages of using a 1064 nm analyzer, the identification of a dietary supplement ingredient—vanadyl sulfate—was attempted with both handheld 785 nm and 1064 nm excitation Raman spectrometers. Figure 2 shows the Raman data acquired using 1064 nm excitation provided fluorescence-free, chemically-specific data that can be used to identify the material. Whereas the 785 nm excitation shows only non-specific fluorescence, as can be seen from the broad curvature of the baseline.

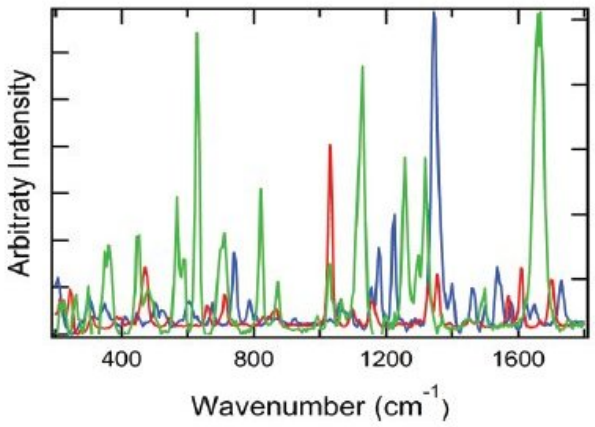


Figure 1: 1064 nm excitation Raman spectra of ascorbic acid, chromium picloninate, and vitamin B2. The specific pattern of Raman peaks allows Raman to be used for material identification.

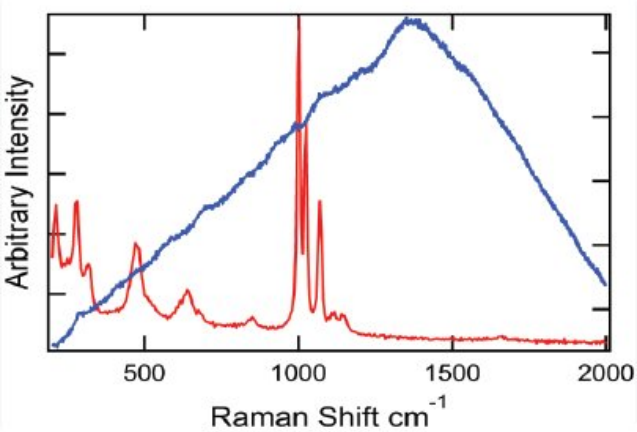


Figure 2: Raman spectra of vanadyl sulfate measured at 785 nm and 1064 nm. The sulfate bands are visible at 1064 nm but are obscured at 785 nm.

Conclusion

Progeny is ideal for identification due to its chemical selectivity. Easy-to-use and implement into your processes, Progeny provides the means for obtaining rapid and objective pass/fail verification of your materials and products at the point-of-need improving quality while reducing analysis time and costs.

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APPLICATION NOTE

ANALYSIS OF DIETARY SUPPLEMENTS, NUTRACEUTICALS, AND THEIR RAW MATERIALS WITH HANDHELD RAMAN

- Improved quality control
- Increased production efficiency
- Raw material identification (RMID)

Progeny

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Rigaku Analytical Devices, Inc.

Related products

Progeny

Handheld Raman for raw material identification and finishe d product authentication using 1064 nm Raman analysis.