

Raman microspectroscopy and imaging in pharmaceutical applications

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ABSTRACT

Raman microspectroscopy and imaging can be used for a wide range of applications, such as the chemical identification of particles and smallest contaminations, the analysis of the distribution of a multitude of different components in a complex mixture. In recent years, the applications of Raman microscopy and imaging in the pharmaceutical world, including capsules, packaging, coatings, sample homogeneity analysis, chemical composition, and combinatorial chemistry, has increased and is projected to continue increasing. After an introduction to the basic principles of Raman microspectroscopy and imaging, the developments of these methods and a comparison with the FT-IR in pharmaceutical applications, will be reviewed.

INTRODUCTION

Pharmaceutical and Biotech companies are starting to implement faster, more reliable analysis methods both throughout their research and development centers and within the manufacturing process. Developing and marketing new pharmaceutical products has forced the regulation of research and development programs. Characterization and monitoring of solid-state properties of the active ingredients and excipients are fundamental elements of the pharmaceutical development since batch-to-batch inconsistency can cause crucial problems in the manufacturing of the pharmaceutical dosage form, the quality of the formulation, the bioavailability and drug stability.

THEORY

INSTRUMENT

APPLICATIONS

- Utilizing Process Analytical Technologies (PAT) for Pharmaceutical Industry
- Drug discovery
- Bacteriology and Microbiology
- Counterfeit Drug Determination
- Contactless Check Weighing in pharmaceutical production
- Pharmaceutical packaging

COMPARISON OF RAMAN AND FT-IR SPECTROSCOPY

CONCLUSIONS

REFERENCE