

Fourier Transform Infrared Spectroscopy for Grape and Wine Analysis

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Summary

Fourier transform infrared (FT-IR) spectroscopy is a non-destructive analytical technique that provides structural information on molecular features of a large range of compounds. The main advantages offered by FT-IR spectroscopy are speed, high degree of automation, medium resolution and cost effectiveness. Recent improvements in FT-IR instrumentation together with advances in fiber optics and chemometrics (multivariate data analysis) have provided an analytical tool that is suitable for routine qualitative analysis and process control in many industries. Although widely applied in the food industry, acceptance of FT-IR technology in the grape and wine industry has been relatively slow and mainly restricted to large wineries. Attitudes towards developments in analytical chemistry are changing rapidly and the influence of both consumers and regulatory bodies are starting to affect the industry. Winemaking demands constant product monitoring and requires process control from the start of grape ripening up to the bottled product. Direct spectroscopic measurement is well suited in this context since it allows for rapid and simultaneous analysis of several compounds (e.g. alcohol, sugars, acidity, glycerol, phenolic compounds, and sulfur dioxide) with minimal sample preparation and reagent consumption. Commercially available FT-IR instrumentation with versatile and innovative software, designed specifically for grape and wine analysis, has recently received much attention. This review evaluates the status and usefulness of application of FT-IR technology and chemometrics in grape and wine analysis. A

shortened version of this manuscript was published in an international journal (*Analytical Chemistry*, 80:1371–1379, 2008).

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