

application note

Automated Measurement of the Colour of Red Wines

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Introduction

Red wine can be analysed and its age monitored by ratioing two specific wavelengths.

The measurement at 520 nm is at the maximum absorption for grape anthocyanins that are responsible for the true red colour. As the wine ages, the red colour turns to red-orange. This corresponds to an increase in yellow colour that absorbs at 420 nm.

The colour hue, shade or tint is indicated by the ratio of the absorbance at 420 nm to that at 520 nm (A_{420}/A_{520}). This value will increase as a red wine ages.

This test, although not applicable to white wines, can be used as any changes in absorbance at 420 nm can be monitored and closely related with browning changes in the wine.

Experimental

The GBC Cintra 20 double beam UV-Visible spectrometer using the Automated Method Application was used in this study.

The instrument was fitted with a 7 x 7 carousel cell holder accessory. This accessory together with a Spectral Basic program, ratio.ini, allowed automated and customised analysis to be performed.

The 7 x 7 carousel cell holder accessory was used to automate the analysis to allow up to 12 samples to be measured automatically and unattended.

Note: The Spectral Basic Macro, ratio.ini, requires that you enter the two wavelengths manually prior to analysis. This enables you enter any wavelength and hence this Macro can be used for any application where the ratio of absorbances at any two wavelengths is required.

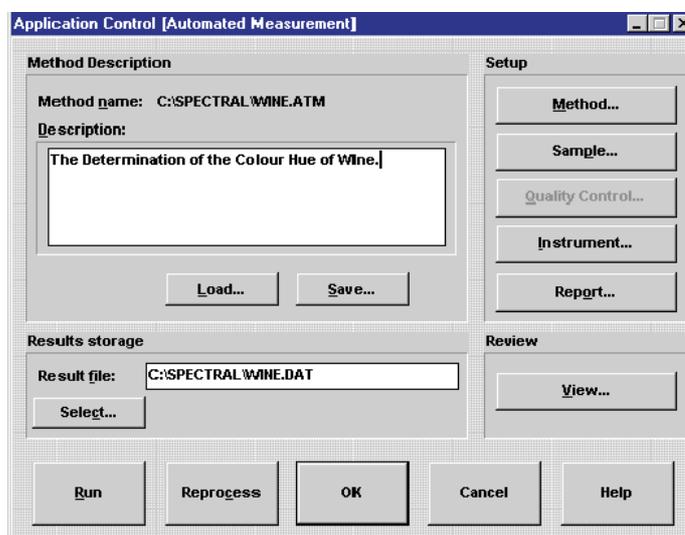


Figure 1: The Main Application Control Page of the Automated Measurement Application

Figure 1 shows the main application control page of the Automated Measurement application

Operating Parameters

Method

Number of Repeat Measurements	1
Number of Replicate Measurements	1
Macro File	Ratio.ini

Sample Setup

Enter the sample labels, such as

Wine 1
Wine 2
Wine 3 etc until
Wine 7 (in 7 x 7 mode) OR
Wine 12 (in 12 x 2 mode)

Instrument

i) Spectrometer

Operation Mode	Wavelength Scan.
Slit Width	0.9 nm (for most wine types)
Photometric Mode	Absorbance.
Scan Range	410 nm to 530 nm
Scan Speed	900 nm/min
Data Interval	0.395 nm

It is recommended that a baseline is performed.

This is done by placing a matched cuvette filled with distilled water in the sample position.

Click on Baseline. The baseline will then be stored and normally does not need to be redone unless any of the parameters on this page are altered or another type of cuvette is used.

ii) 7 x 7 Automated Cell Holder

To set up the 7 x 7 Automated Cell holder from the *instrument* page, select *Option* then *Configuration* and set the 7 x 7 accessory to INSTRUMENT.

Click on *Accessory* in the *Instrument* page, then click on 7 x 7 (which should be highlighted). The 7 x 7 can be set either in the 7 x 7 mode, enabling you to have 7 samples and 7 reference solutions, or the

12 x 2 mode enabling you to have 12 samples and 2 reference solutions.

The operation mode for this accessory should be set to automatic.

Report

The various parameters on this page can be tailored to your requirements.

Performing the analysis

On the Application Control Page click on RUN

You will be prompted for Wavelength 1. Enter 420 in the field and click on OK.

You will then be prompted for wavelength 2. Enter 520 in the field and click on OK.

The samples will now be analysed.

The 420/520 value will be small for a red wine. As the wine matures the 420/520 ratio will become larger.