

20 JANUARY 2011



NEW CAPABILITIES

Wine color plays a significant role in the perception of quality. Color is also a useful indicator for many issues related to wine development.

ETS Laboratories has developed a tool that allows winemakers to precisely monitor and record wine color for purposes of research, product consistency, and quality control.

When used regularly, as part of the winemaking process, the Wine Color Analysis can help winemakers confirm and document their own impressions of color and build a valuable database for long-term reference.

QUALITY ASSURANCE

Maintaining lot-to-lot and vintage-to-vintage color consistency is important to many wineries. ETS Wine Color Analysis helps set quality control parameters for acceptable color variation.

COLOR MONITORING

Color analysis allows wineries to document the effect of fermentation variables on wine color. Once a control or reference value has been established, future analysis can compare the results of one fermentation program to another.

PROBLEM SOLVING

Wineries with on-going color problems can document variation and identify when changes occur by running a Wine Color Analysis at crush and at regular intervals thereafter.

THE WINE SPECTRA

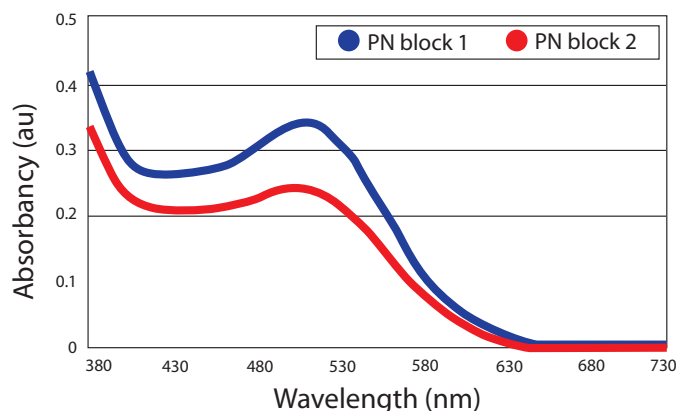
Winemakers traditionally rely on a narrow spectrum to quantify wine color – specifically the amount of light that wine absorbs at two key wavelengths: 420 nm and 520 nm. Using these values, winemakers can develop an impression of a wine's redness, brownness, or yellowness. ETS Wine Color Report includes these familiar values along with their sum, ratio-estimates of hue and total color.

Since the color of wine is determined by the absorbance of light in the entire visible spectrum, the report also includes an easy-to-read representation of the wine's full spectra.

Visual documentation of the entire visible spectrum allows winemakers to immediately evaluate 420/520 measurements in the context of other wavelengths that may significantly influence color nuance.

SPECTRAL DATA		
WAVELENGTH	PN BLOCK 1	PN BLOCK 2
420 nm	0.265	0.216
520 nm	0.346	0.247
420 + 520	0.612	0.462
420/520	0.767	0.875

Wine Spectra

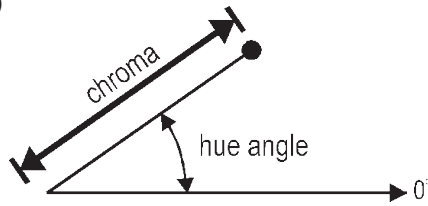


ETS WINE COLOR ANALYSIS

CIELAB COORDINATES

Color-sensitive industries rely on the accuracy of CIELab Tri-Coordinate Color Descriptions. The ETS Wine Color Analysis applies these precision color measurements to wine. The report presents CIELab coordinates via a color plot map and a numeric table.

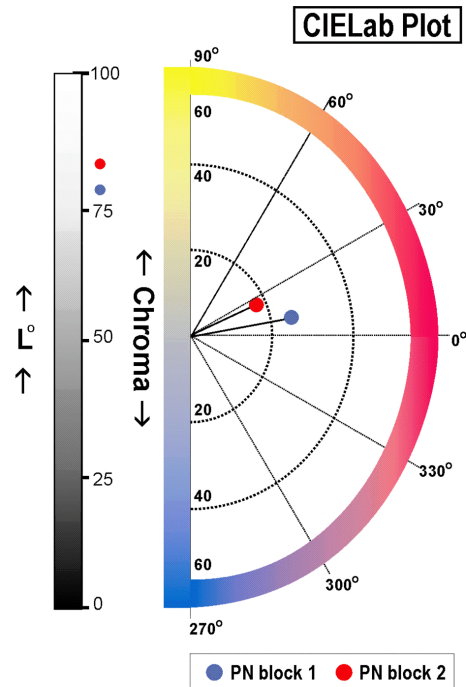
The CIELab system describes color with three parameters. The parameters are L^* = degree of lightness, a^* = red (+) to green (-), b^* = yellow (+) to blue (-). Standard calculations are Hue Angle $^\circ$ expressed as degrees from 0 $^\circ$ (red) to 90 $^\circ$ (yellow) to 270 $^\circ$ (blue), and Chroma expressing the measurement of hue intensity.



In addition, the Wine Color Report shows the difference between two samples at several key points of comparison. ΔL^* , Δa^* and Δb^* are the difference in the L^* , a^* and b^* respectively. ΔE represents the total color difference between the two samples and is often used to define color tolerances in quality control programs.

CIELAB COORDINATES (ILLUMINANT D650)			
STD OBS 10°	PN BLOCK 1	PN BLOCK 2	$\Delta E = 8.2$
L^*	80.2	85.3	$\Delta L^* = 5.1$
a^*	20.4	14.1	$\Delta a^* = 6.3$
b^*	4.0	5.3	$\Delta b^* = 1.3$
Hue Angle $^\circ$	11.2 $^\circ$	20.7 $^\circ$	
Chroma	29.3	20.8	

The CIELab Plot map serves as a quick visual presentation of results. The L^* (lightness) coordinate, shown as a separate bar on the left, describes dark (0) to light (100). The colored, curved perimeter of the CIELab plot offers a quick indication of the difference in hue between two samples. Hue defines the category of color- (red, blue, orange, etc.); chroma establishes how much of a particular hue is present, that is, its intensity or saturation.



ANALYTICAL DETAILS	
METHODOLOGY	Spectral Analysis
EQUIPMENT USED	UV/VIS Spectrophotometry
SAMPLE SIZE REQUIRED	Representative 50 mL sample
TARGET RESPONSE TIME	2 working days from receipt of samples

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