

Determination of Total Polyphenol in red wine by using UV/Visible Spectrophotometer



Instrument: UV 400S Spectrophotometer

Wavelength range: 190 – 1100 nm

Spectral bandwidth: 1.8 nm

■ Material and Methods of The Experiment

Chemical and Samples

- 1 M HCl

Procedure

- 1) Dilute 1:50 in 1 M HCl with 9.8 mL 1M HCl to 0.2 mL of sample in a 10 mL centrifuge tube.
- 2) Samples were mixed well every 20 min over an hour while being stored in the dark at room temperature.
- 3) After being transferred to 10 mm pathlength UV-grade disposable cuvettes each sample was scanned using wavelengths between 200 to 600 nm with a spectrophotometer.
- 4) The total polyphenol content of each sample was represented by the absorbance, measured in absorbance units (AU), at 280 nm.

As the samples were diluted, the results of each sample in AU were then multiplied by the dilution factor, to create a Total polyphenol Index (TPI).

This step allows polyphenol content measured by A₂₈₀ to be easily compared, especially when samples may differ and require a range of dilutions.

▪ Result

A spectrophotometer can easily determine the total polyphenol in wine by measuring the absorbance of a test solution at 280 nm then multiplied by the dilution factor, in this case, to create a Total polyphenol Index (TPI).

TPI value	Grade
< 30	Very Light-bodied
30 – 40	Light-bodied
40 – 60	Medium-bodied / Balanced structure
60 – 80	Full-bodied / Good aging potential
➤ 80	Very Robust / High tannin concentration

Table 1: Classification of Red Wine Characteristics Based on Total Phenolic Index (TPI)

▪ Conclusion

The UV/Vis Spectrophotometer is a good choice to measure the polyphenol in the sample because it is easy, fast, cheap, highly sensitive and give an accurate concentration of polyphenol.

▪ Reference

Ribéreau-Gayon, P., Glories, Y., Maujean, A., & Dubourdieu, D. (2006). Handbook of enology: Volume 2: The chemistry of wine stabilization and treatments (2nd ed.). John Wiley & Sons.