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Related products
Alpha
Country of Origin: Korea

Application Notes
#A250008001

Determination of Wine Phenol Content

Introduction

Wine consumption has proven to provide important health benefits. There is evidence that the presence of different phenolic substances, specifically those richly present in wine, might contribute to these biological effects on human health and disease prevention. The phenolic compounds also contribute to the sensory character of wine and is a standardized indicator to estimate the state of quality of wine worldwide. The accurate determination of total phenolic content in wine samples thus serves a great purpose in ascertaining the correct quality and market value. The traditional determination method of phenolic content in laboratory relies on the Folin-Ciocalteu (FC) method based on the principle of spectral detection. In FC method, the FC assay uses a redox reagent (mixture of phosphomolybdate and phosphotungstate) acts as a colorimetric agent, which produces blue coloured chromagen complex absorbing strongly at 740nm after reduction. Gallic acid (a phenolic compound) is used in this experiment a standard to determine the phenolic content in wine.

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Instrument and Materials

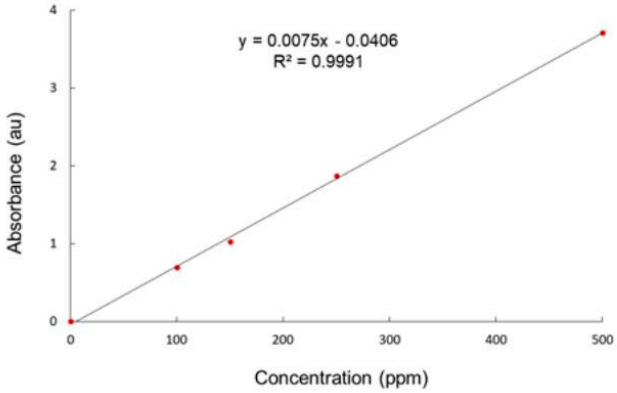
1. Alpha spectrophotometer
2. Cuvette (1 cm)
3. Analytical balance
4. Red wine and white wine samples
5. Gallic acid
6. Deionized water
7. 2 N Folin Ciocalteu reagent
8. Saturated solution of sodium carbonate (Na2CO3)

Experimental Process

1. One part of FC reagent is added with ten parts of deionized water to prepare 0.2 N FC reagent.
2. Several gallic acid standard solutions are prepared with varied concentration (0 - 500 ppm) by serial dilution process.
3. Red wine sample are diluted by a factor of 6, while white wine sample are used without any dilution.
4. Each standard solutions of gallic acid and the unknown wine samples were treated the same way before spectroscopic measurement.
5. To 1 ml of each standard and unknown wine sample 5 ml of FC reagent is added. A 3-5 minutes waiting time is maintained after that.
6. Following this 4 ml of Na2CO3 is added and the standards and samples are left for two hours for colour development.
7. The absorbance of each of the standards is checked at 740 nm, and a calibration curve is drawn.
8. Finally, the absorbance values of the wine samples are measured and calculated from the calibration curve equation.

Results

Figure 1 depicts the calibration curve derived from plotting the absorbance values of the gallic acid standard samples. The linear correlation coefficient (R^2) is calculated from the curve, and greater than 0.999 value indicates high level of correlation.



[Figure 1] - Calibration curve of gallic acid standards

Calculation of total phenol concentration

For red wine sample, the dilution factor 6 is required to be taken into account. So, the result derived from calibration curve equation is multiplied by 6 to get the actual value of total phenol content in red wine samples. Dilution factor consideration is not required for white wine sample. The results are below in Table 1.

[Table 1] - Total phenol content result

Sample	Concentration (mg/ml)	Absorbance (at 740nm)	Dilution factor	Actual concentration (mg/ml)
Red Wine 1	538.75	4.00	6	3232.48
White Wine	410.75	3.04	1	410.75

Conclusion

The Alpha spectrophotometer has carried out the quantification of the total phenol content determination of various wine samples with relative ease and high level of sensitivity. This is an ideal instrument for more demanding application in research and testing atmospheres.