

Polyphenol Index Determination: Permanganate Index

Chemical Concepts and Techniques:

Phenolic compounds, commonly named tannins, have an important effect on the colour and taste of wines, mainly red wines.¹

A total polyphenol index is defined in order to estimate the total content of phenolic compounds as the sum of their individual contributions, determining their contribution to wine characteristics. This index is based on the reductive character of these compounds with respect to permanganate solution (permanganate index)

Equipment Required:

250mL Erlenmeyer flasks

50mL bulb pipette

2mL bulb pipette

50mL burette

Reagent Preparation:

0.01N Potassium Permanganate: Dissolve 0.316g potassium permanganate in approximately 500mL of distilled water. Dilute to 1.0L in a volumetric flask with distilled water. Mix well.

Indigo Carmine solution: Add 0.15g indigo carmine to approximately 500mL distilled water. Transfer quantitatively to a 1.0L volumetric flask. Add 50mL dilute sulphuric acid solution and dilute to volume with distilled water. Mix well.

Dilute sulphuric acid solution: slowly and carefully and with stirring add one volume of concentrated sulphuric acid to two volumes of distilled water. (Caution: heat evolved) Mix well and allow to cool.

Method:

1. Pipette 50mL of indigo carmine solution into an Erlenmeyer flask.
2. Fill the burette with 0.01N potassium permanganate solution. Record the initial burette reading.
3. Titrate the indigo carmine solution with permanganate to an endpoint colour change from blue to straw yellow or orange. Record the burette reading at the end point.
4. Calculate the blank titre value A.

5. Pipette 50mL of indigo carmine solution into a second flask. Add 2.0mL of wine.
6. Titrate with permanganate to the same endpoint. Record the burette reading before and after titrating and calculate the sample titre value B.
7. Calculate the permanganate index using the following formula:

$$\text{Permanganate Index} = 5(B - A)$$

A permanganate index of 25 is equivalent to 320 mg/L GAE (Gallic Acid Equivalents). A Permanganate Index of 95 is equivalent to 2390mg/L GAE.

Points to consider:

- This test is used as a quick screening aid and is limited in it

References:

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