SD6012: TARTARIC ACID

COLORIMETRIC - METAVANADATE

PURPOSE OF THE TEST

Tartaric acid is the main component that provides wine with its characteristic acidity, being present both in its acid form and as potassium salt. From the point of view of production, it is a critical element in the development of colour and flavour during the maturation process of the wine, as well as its subsequent chemical stability. The determination of tartaric during the whole elaboration process allows to keep controlled its organoleptic evolution.

METHOD

Tartaric acid forms a coloured complex in presence of vanadium salts in an acidic medium. The absorbance of the reaction mixture at 520 nm is directly proportional to the concentration of tartaric acid.

CONTENT

R1	2 x 30 mL 	Acetate buffer pH 2.5 *WARNING: H226: Flammable liquid and vapour. H314: Causes severe skin burns and eye damage. P262: Do not get in eyes, on skin, or on clothing. P302+P352: IF ON SKIN: Wash with plenty of water. P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.*
R2	1 x 15 mL	Acetate buffer pH 2.5, Ammonium Metavanadate
CTRL	1 x 3 mL	Tartaric acid 3 g/L (2,55 – 3,45 g/L)

REAGENT PREPARATION

Reagents are ready to use and are stable up to expiry date as supplied when stored at 15-25 ºC. Do not refrigerate or freeze.

Discard if absorbance of blank is higher than 0.300 OD at 520 nm.

SAMPLES

The samples must be free of turbidity and particles. Centrifuge or filter if necessary. The presence of CO_2 introduces instability in the measure. Samples containing CO_2 must be degassed beforehand. In samples with very high colour intensity, the pigment may interfere with the measurement. Treat with PVPP (0.1 g per 10 mL) or 10% sodium hypochlorite (1 part hypochlorite per 3 parts sample; correct the result by the dilution factor 1.33) to reduce color. Discoloration with activated carbon alters the result of tartaric[4-5]. Samples with concentration higher than the measurement range must be diluted accordingly with distilled water. Multiply the final result by the dilution factor.

PROCEDURE OVERVIEW

Treat standard, controls and samples as sample. Use distilled water as Blank.

Volumes stated below can be adjusted to other analytical procedures. Expected performance can vary if those ratios S:R1:R2 are not used exactly as stated.

Pipette into a cuvette:

	Blank reaction	Test Reaction
Reagent 1	800 µL	800 µL
Distilled water	40 µL	--
Sample/Standard	--	40 µL

Mix, incubate at 37ºC for 1 minutes and read absorbance at 520 nm (A_1). Then add into the cuvette:

	Blank reaction	Test Reaction
Reagent 2	200 µL	200 µL

Mix, incubate for 10 minutes at 37ºC and read absorbance at 520 nm (A_2).

Concentration of tartaric acid is calculated as:

$$Tartaric = \frac{(A_2 - 0.81xA_1)_{\text{sample}} - (A_2 - 0.81xA_1)_{\text{blank}}}{(A_2 - 0.81xA_1)_{\text{standard}} - (A_2 - 0.81xA_1)_{\text{blank}}} \; x \; C \text{ g/L}$$

Factor 0.81 is used to correct absorbance for dilution after adding reagent 2. C is the value of concentration stated in the label for tartaric acid.

ASSAY PARAMETERS FOR ANALYZERS DIONYSOS®

Dionysos model	**150**	**240**
Name	TARTARIC	
Method	End Point A	
Direction	Increasing	
Main Wavelength	520	
Sec. Wavelength	--	
Sample	10	
Reagent 1	200	
Reagent 2	50	
Calibration	Linear	
Blank cycle [150 | 240]	3 - 4	3 - 4
Reading cycle [150 | 240]	20 - 21	31 - 32
Units	g/L	
Decimals	0.00	
Measure range	0.20 ~ 10.50	
R1 Lim. Abs	3000	
Ratio Dil. Auto.	--	
Vol. Sample Dil. Auto	--	

Procedure is linear up to 10.5 g/L. Calibrate with a single point using the highest concentration standard or with several points as per your quality procedures.

PERFORMANCE

Limit of quantification: 0.2 g/L
Limit of linearity: 10.5 g/L

NOTES

It is recommended to use wine controls to verify quality of calibration. Each laboratory should establish its own quality criteria for acceptance, as well as proper corrective action procedures in case of rejection.

Presence of L-malic acid can introduce negative interferences. Tartaric value could be corrected as:

$$Tartaric_{\text{corrected}} \text{ g/L} = Tartaric \text{ g/L} - 0.15 \; x \; Malic \text{ g/L}$$

REFERENCES

1. Compendium of International methods of analysis – OIV, Vol 1&2 (2008).
2. Bermeyer, HU. Methods of Enzymatic Analysis, 2nd Ed. Vol. 1, p. 112-117. Academic Press, Inc. NY. (1974)
3. Zoecklein BW, Fugelsang KC, Gump BH, Nury FS. Wine analysis and production. Van Nostrand Reinhold, 1st Ed. (1990).
4. Gordon J. Pilone. Am J Enol Vitic. January 1977 28: 104-107
5. Leonard R. Mattick, Andrew C. Rice. Am J Enol Vitic. January 1981 32: 297-298

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