Ti Application Note No. T- 72

Title:	**Reducing sugars in wine and sweets**

***Summary*:**	Determination of reducing sugars in wine and sweets according to Fehling's method by potentiometric/iodometric titration using the Pt Titrode.

Sample:	Red or white wine, sweets

Sample Preparation:	None for wine. For sweets dissolve one piece (approx. 4 g) in dist. water, make up to 100 mL and mix.

Instruments and Accessories:	702, 716, 736, 751 or 785 Titrino or 726 or 796 Titroprocessor, 6.0431.100 Pt Titrode

Analysis:

Remarks:

Experiments have shown that the reaction follows a logarithmic function. In order to remain within the linear range (where the titrant consumption is proportional to the glucose content), the sample to be titrated should contain 20 ... 40 mg glucose. Thus, depending on the expected glucose content, the following sample volumes should be used for the titration:

Glucose content / g/L	Sample volume / mL	Factor
2	15	0.1333
5	6	0.3333
10 ... 20	2	1
25 ... 30	1	2

Titer determination:

Glucose standard solutions with a concentration of 10 g/L and 20 g/L are prepared in dist. water. 2.0 mL of these standard solutions are then titrated as described below.

g/L reducing sugars = (C01 – EP1) * C02

EP1 = titrant consumption for the glucose standard in mL
C01 = titrant consumption for the blank in mL
C02 = 1.8 (calculation factor for invert sugar)

The obtained results are used to calculate the titer of the thiosulfate titrant, which is stored as C30:

titer = theoretical glucose concentration / calculated sugar concentration

Example:

10 g/L / 11.4 g/L = 0.8772
20 g/L / 21.8 g/L = 0.9174

titer = (0.8772 + 0.9174) / 2 = 0.8973 ± 0.028
= 0.8973 ± 3.2%

Sample analysis:

Pipet 1 ... 15 mL sample (see table above) into a beaker. Add 10.00 mL acidic c($CuSO_4$) = 0.168 mol/L and 5 mL alkaline potassium sodium tartrate solution (0.89 mol/L), heat up and boil for exactly 30 s. Cool down rapidly with tap water. Add 10 mL w(KI) = 15%, 10 mL w(H_2SO_4) = 16% as well as 10 mL dist. water, then titrate with c(thiosulfate) = 0.1 mol/L.
Carry out a blank determination using 10 mL dist. water instead of the sample. Store the titrant consumption for the blank as C01.

Calculations:

Analysis of wine:

g/L reducing sugars = (C01 – EP1) * C02 * factor * C30

Analysis of sweets:

% reducing sugars
= (C01 – EP1) * C03 * C04 * C05 * factor * C30 / C00

EP1 = titrant consumption for the sample in mL
C00 = approx. 4 (sample weight in g)
C01 = titrant consumption for the blank in mL
C02 = 1.8 (calculation factor for invert sugar)
C03 = 0.1 (concentration of the titrant in mol/L)
C04 = 36 [= 180 / 5 = M(glucose) in g/mol / 5]
C05 = 5 [= 50 (dilution factor) * 0.1 (conversion factor for %)]
C30 = titer of the titrant (see above)

Results:

Red wine: AVG(3) = 4.05 ± 0.002 g/L reducing sugars
Sweets: AVG(3) = 19.52 ± 0.05 % reducing sugars