Rebelein's Kit

VINIKIT

Application

Determination of total sugars in wine according to Rebelein method

It is necessary to know sugar concentration in grape, must and wine, in order to determine the optimal time for the grape harvest according to the ripening index (sugar/total acidity), the alcoholic fermentation follow up, the production control and the wines classification (Table I and II).

Sucrose is hydrolyzed during the alcoholic fermentation, generating a molecule of glucose and another of fructose. So, presence of sucrose in wines may be due to the addition of sucrose in the sweetening processes of sparkling wines.

PanReac AppliChem offers in a single kit the reagents needed to make this determination according to Rebelein method.

Principle

This technique is based on the glucose and fructose reduction properties over a copper alkaline solution. In the presence of both sugars, the Cu^{2+} is reduced to Cu^+ in an alkaline medium when boiling, titrating afterwards the excess of Cu^{2+} ions.

A previous hydrolysis is done, to include the possible free sucrose present in the sample (point 1 from the procedure).

Legislation

Still and sparkling wines can be classified according to the sugar concentration as showed in Tables I and II.

Table I. Still wines classification according to the sugar concentration

Type of wine	Total sugar (g/L)
dry	≤ 4 or ≤ 9*
semi-dry	≤ 12
semi-sweet	> 12 and ≤ 45
sweet	> 45

Regulation (EC) No 753/2002 of 29 April 2002
* in case of (total sugars - total acidity) ≤ 2

Table II. Sparkling wines classification according to the sugar concentration

Type of sparkling wine	Total sugar (g/L)
brut nature	< 3
extra brut	≤ 6
brut	< 15
extra dry	12-20
dry	17-35
semi-dry	33-50
sweet	> 50

Regulation (EC) No 1493/1999 of 17 May 1999

Procedure

It is advisable to know in advance the approximate quantity of sugars present in the sample because this is an optimal method to detect concentrations up to approx. 28 g/L. For higher concentrations, it will be necessary to dilute the sample. It can be calculated according to the following formula:

Total sugars (g/L) = [2590 × (ρ20ºC − 1 + (0.0011 × A))] − 18.6

ρ20ºC = density, g/ml
A = alcoholic grade, % vol

1. Pour 2.0 ml of sample in an erlenmeyer flask and 10.0 ml of Cupric Solution 0.168 mol/l, some drops of Silicone antifoaming liquid (AQ) (code 216241) and some granules of Pumice Stone. Place a funnel over the erlenmeyer and heat over a heating plate till boiling during 2 minutes.
2. While boiling add, with a graduated cylinder, 5 ml of Alkaline Solution (Potassium Sodium Tartrate) 0.886 mol/l with the aid of the funnel and keep it boiling during 1.5 minutes.
3. Cool with cold water and, with a graduated cylinder, add 10 ml of Potassium Iodide solution 30% w/v, 10 ml of Sulfuric Acid solution 16% v/v and 10 ml of Starch solution 2%.
4. Titrate with Sodium Thiosulfate 0.0551 mol/l (0.0551N) to a light cream or grey-yellow colour.
5. Make a blank test replacing the sample with distilled water.

It is convenient to defecate or discolour red wines before its analysis in order to avoid the interference of other reducing substances as for example polyphenols. Any of the following products can be used: polyvinylpyrrolidone (PVPP), zinc ferrocyanide, etc.

Results

The total sugar is measured in g/L with 1 decimal accuracy and it's calculated according to the following formula:

Total sugars (g/L) = (v − v') × f

v = ml of Sodium Thiosulfate 0.0551M used in the blank titration
v' = ml of Sodium Thiosulfate 0.0551M used in the sample titration
f = dilution factor

Reagents

Description	Code	Package
Rebelein's Kit VINIKIT, for wine analysis The kit consists of: Cupric Solution 0.168 mol/l -- 1 x 500 ml Potassium Iodide solution 30% w/v -- 1 x 500 ml Potassium Sodium Tartrate 0.886 mol/l, alkaline solution -- 1 x 250 ml Pumice Stone granules -- 1 x 5 g Sodium Thiosulfate 0.0551 mol/l (0.0551N) -- 1 x 1000 ml Starch solution 2% -- 500 ml Sulfuric Acid solution 16% v/v -- 500 ml	**624901.0922**	**pack**
Additionally, it's also needed: Silicone antifoaming liquid (AQ) technical grade	216241.1210	500 ml
The reagents included in the kit can also be ordered separately:		
Cupric Solution 0.168 mol/l VINIKIT, for wine analysis	624582.1210	500 ml
Potassium Iodide solution 30% w/v VINIKIT, for wine analysis	624572.1210	500 ml
Potassium Sodium Tartrate 0.886 mol/l, alkaline solution VINIKIT, for wine analysis	624573.1209	250 ml
Pumice Stone granules technical grade	211835.1209	250 g
Sodium Thiosulfate 0.0551 mol/l (0.0551N) VINIKIT, for wine analysis	624576.1211	1000 ml
Starch solution 2% VINIKIT, for wine analysis	624567.1210	500 ml
Sulfuric Acid solution 16% v/v VINIKIT, for wine analysis	624570.1210	500 ml