



# Wine Analysis made easy

**FOOD**QUALITY  
BY BIOSYSTEMS

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P-Vila

Pau Vila Cases Ph. D.  
Director General  
BioSystems S.A.



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## Acetaldehyde | Ref. 12820

Enzymatic analysis for acetaldehyde determination

### Advantages

- Stable working reagent for 3 weeks
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Acetaldehyde is one of the components of the oxidative chain of alcoholic fermentation. Acetaldehyde is also formed in the wine aging process by ethanol oxidation. Acetaldehyde concentration is closely related to SO<sub>2</sub> content. This combination is responsible for antioxidant activity.

Acetaldehyde in the sample yields NADH (by the following reaction), which can be measured by spectrophotometry.



Kit volume: 50 mL

Method: Two-reagent differential, reading at 340 nm

Limit of linearity:: 200 mg/L

Limit of detection: 0,1 mg/L

## Ammonia | Ref. 12809

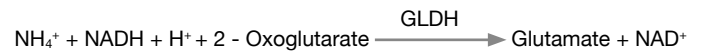
Enzymatic method for ammonia determination

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Low nitrogen levels have been related to slow fermentation or sulfide production. Conversely, high levels can lead to microbial instability and production of ethyl carbonate.

Ammonia in the sample consumes NADH (according to the following reaction), which is then assayed by spectrophotometry.



Kit volume: 100 mL

Method: Two-reagent differential, reading at 340 nm

Limit of linearity:: 200 mg/L

Limit of detection: 3 mg/L

# Acetic Acid | Ref. 12810

## Enzymatic method for acetic acid determination

### Advantages

- Stable working reagent for 1 month
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Kit volume: 100 mL

Method: Two-reagent differential, reading at 340 nm

Linealidad: 1,3 g/L

Limit of detection: 0,03 g/L



Acetic acid is produced during both alcoholic and malolactic fermentations and helps enhance flavors and aromas. When the wine is aerated or remains in contact with air, acetic acid bacteria can multiply, leading to a problem known as “acetic spoilage”. The characteristic aroma of this spoilage is due to ethyl acetate.

Acetate in the sample consumes NADH (by the following reaction), which can be measured by spectrophotometry.



## Anthocyanins | Ref. 12831

Colorimetric analysis  
for the assay of anthocyanins

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent

Anthocyanins are the tinted pigments in grapes, with the word coming from the Greek root “antos” (flower) and “kyanos” (blue). These pigments are found in both the skin and the pulp.

Anthocyanins are water-soluble pigments that provide the characteristic red color of wine. At 520 nm and under certain conditions, the color is proportional to anthocyanin concentrations. The proposed method determines ionized and ionizable anthocyanins present in the sample. Anthocyanins polymerized with tannins or other compounds cannot be assayed with this method.

Kit volume: 100 mL

Method: End point with reading at 520 nm

Limit of linearity:: 1386 mg/L

Limit of detection: 15 mg/L

## Ascorbic Acid | Ref. 12828

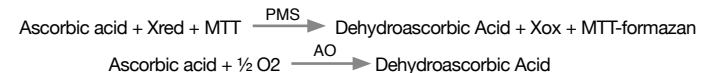
Enzymatic method  
for ascorbic acid determination

### Advantages

- Stable working reagent for 10 days
- Ready-to-use dedicated reagent
- Calibrator included in the kit. Once reconstituted, stable for 20 days

Ascorbic acid is a compound found in ripe grapes at very low levels compared with other acids (30-60 mg/L). It disappears rapidly when grapes are crushed, leading to early oxidation of must. Due to its reducing properties, ascorbic acid is used as an antioxidant.

Ascorbic acid in the sample lowers MTT in the presence of PMS electron carrier, forming dehydroascorbic acid and MTT-formazan that can be assayed by spectrophotometry. To eliminate interferences ascorbic acid is eliminated from the sample by oxidation to dehydroascorbic acid (ascorbate oxidase [AO]).



Kit volume: 90 mL

Method: Two-reagent differential, reading at 560 nm

Limit of linearity:: 150 mg/L

Limit of detection: 1,4 mg/L

## Calcium | Ref. 12824

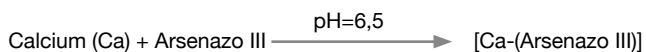
Colorimetric analysis  
for calcium determination

### Advantages

- Stable two-reagent liquid until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Calcium is present in wine at concentrations of 6 to 165 mg/L. Instability due to calcium tartrate appears at 4 to 7 months of fermentation.

Calcium in the sample reacts with 2,7-[bis(2-arsenophenylazo)]-1,8-dihydroxynaphthalene-3,6-disulfonic acid (Arsenazo III). The color increase is directly proportional to the calcium concentration of the sample.



Kit volume: 80 mL

Method: Two-reagent differential, reading at 635 nm

Limit of linearity: 180 mg/L

Limit of detection: 2 mg/L

## Catechins | Ref. 12834

Colorimetric analysis  
for the assay of catechins

### Advantages

- Stable liquid reagent until the expiration date
- Stable working reagent for 4 months
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Catechins reduce and prevent anthocyanin oxidation, keeping them from being precipitated. They are also responsible for the bitterness, astringency, yellow hue, structure and stability of the wine. When catechins are polymerized, they form procyanidins that gradually form complexes with proteins, peptides and polysaccharides.

Catechins in the sample react with the chromogen 4-(dimethylamino)-cinnamaldehyde in the presence of ethanol and an acidic medium, forming a colored complex that can be assayed by spectrophotometry.



Kit volume: 100 mL

Method: Two-reagent differential, reading at 620 nm

Limit of linearity: 500 mg/L

Limit of detection: 12 mg/L

## Citric Acid | Ref. 12825

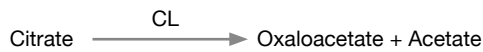
Enzymatic method  
for citric acid determination

### Advantages

- Stable working reagent for 1 month
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Citric acid is an organic acid naturally present in wine that contributes to total wine acidity. Its content is higher in white wine, as the content in red wine drops during malolactic fermentation yielding volatile acids. The permissible legal limit is 1 g/L, and its concentration must be controlled by wine exporters.

Citrate in the sample yields oxaloacetate due to the action of the enzyme known as lyase citrate. All oxaloacetate from citrate in the sample is converted into L-malic acid by the enzyme L-malate dehydrogenase. The disappearance of NADH may be read by spectrophotometry.



Kit volume: 50 mL

Method: Two-reagent differential, reading at 340 nm

Limit of linearity: 400 mg/L

Limit of detection: 11 mg/L

## Color | Ref. 12816

Colorimetric analysis  
for color determination

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent

Wine color plays a major role in the impression of quality. Color is also an important indicator in many winemaking processes. Regular use of this test allows enologists to document and confirm their own impressions.

The wine sample is diluted in a buffer solution that does not alter color-related properties. Absorbance reading at 420 nm, 520 nm and 620 nm allows the chromatic characteristics to be calculated.

Kit volume: 80 mL

Method: End point monoreagent reading at 420, 520 y 620

Limit of linearity: 18 ( $A_{420}$ ,  $A_{520}$  y  $A_{620}$ )

Limit of detection: 0,113 ( $A_{420}$ ), 0,144 ( $A_{520}$ ) y 0,121 ( $A_{620}$ )

## Copper | Ref. 12814

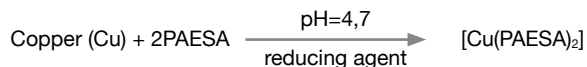
### Colorimetric analysis for copper determination

#### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Copper is a metal that clearly originates in the process of vinegrowing. The main source is phytosanitary treatments of vineyards to prevent mildew. During harvest, the copper content may be 4 to 6 mg/L. During fermentation its concentration decreases to 0.2-0.3 mg/L due to the formation of copper sulfides or the presence of yeasts that fix the copper contained in the medium. The OIV has set a maximum acceptable limit of copper of 1 mg/L.

Any copper in the sample reacts with 4-(3,5-dibromo-2-pyridylazo)-N-ethyl-N-sulfopropylaniline (PAESA). The color increase is directly proportional to the copper concentration of the sample.



Kit volume: 100 mL

Method: Two-reagent differential, reading at 560 nm

Limit of linearity: 7 mg/L

Limit of detection: 0,4 mg/L

## CO<sub>2</sub> | Ref. 12832

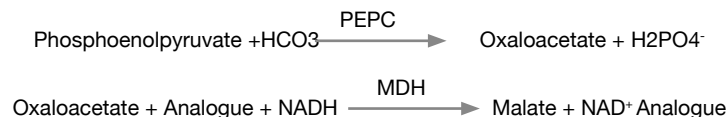
### Enzymatic method for CO<sub>2</sub> determination

#### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Carbon dioxide is a natural gas produced during fermentation that is dissolved in wines. The addition of CO<sub>2</sub> during preparation directly affects the aroma and taste of wine and can enhance freshness and acidity in the mouth, softening the sweetness. However, it can also intensify bitterness and astringency.

According to the coupled reactions described below, carbon dioxide (CO<sub>2</sub>) in the sample consumes NADH analogue co-factors that can be assayed by spectrophotometry at 405 nm.



Kit volume: 50 mL

Method: Single-reagent fixed time, reading at 405 nm

Limit of linearity: 1500 mg/L

Limit of detection: 55 mg/L

# D-Gluconic Acid / D-Gluconolactone

| Ref. 12811

Enzymatic method for D-gluconic acid /  
D-gluconolactone determination

## Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Kit volume: 100 mL

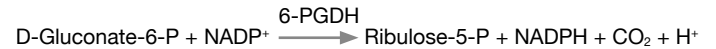
Method: Two-reagent differential, reading at 340 nm

Limit of linearity: 2 g/L

Limit of detection: 0,003 g/L

D-gluconic acid is an indicator of grape deterioration and sanitary condition

D-gluconic acid in the sample yields NADPH (by the following reaction), which can be measured by spectrophotometry.



D-gluconolactone can be determined according to the same principle after alkaline hydrolysis.



# D-Glucose / D-Fructose | Ref. 12800

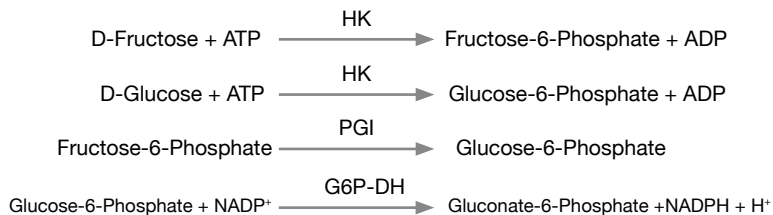
## Enzymatic method for D-glucose / D-fructose determination

### Advantages

- Stable liquid reagent until the expiration date
- Working reagent stable until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

This test indicates the best moment for grape harvesting and allows alcoholic fermentation to be monitored. It is widely used to determine the dryness of the wine before bottling.

D-fructose and D-glucose in the sample generate NADH (by the following reaction), which can be measured by spectrophotometry. The configuration of these reagents allows D-glucose/D-fructose (total sugars) to be determined if the enzyme PGI is added or D-glucose to be determined if it is not.



Kit volume:	120 mL
Method:	Two-reagent differential, reading at 340 nm
Limit of linearity:	8 g/L
Limit of detection:	D-Glucose: 0,03 g/L D-Glucose / D-Fructose: 0,02 g/L

## D-Lactic Acid | Ref. 12801

Enzymatic method  
for D-lactic acid determination

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

The excess of bacteria that are producing D-Lactic acid can inhibit alcoholic fermentation, converting some sugars into D-lactic acid. This is one of the main problems in the wine-making process. Levels above 0.3 g/L of D-lactic acid indicate bacterial contamination.

D-lactic acid in the sample yields NADH (by the following reaction), which can be measured by spectrophotometry.



Kit volume: 100 mL

Method: Two-reagent differential, reading at 340 nm

Limit of linearity: 0,25 mg/L

Limit of detection: 0,004 g/L

## Glycerol | Ref. 12812

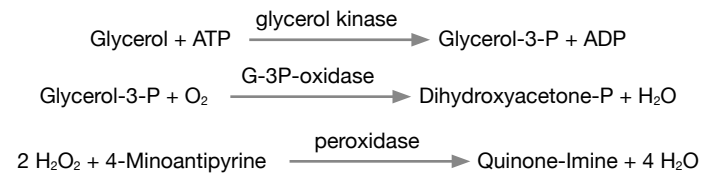
Colorimetric analysis  
for glycerol determination

### Advantages

- Stable one-reagent liquid until expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Glycerol is an indicator of the quality of finished wine and is extremely important for the mouthfeel. High glycerol concentrations add sweetness, body and fullness to the wine.

Glycerol in the sample yields (by the following reaction), a colored complex that is assayed by spectrophotometry.



Kit volume: 100 mL

Method: Two-reagent differential, reading at 500 ± 20 nm

Limit of linearity: 20 g/L

Limit of detection: 0,24 g/L

# Free Sulfite | Ref. 12813

## Colorimetric analysis for free sulfite determination

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit



Most sulfur dioxide added to the must or wine combines with different organic compounds. This is the predominant fraction in wine; however, there is another fraction that is not combined, namely, free SO<sub>2</sub>. Although it is present in lower amounts, its antiseptic and antioxidant properties are superior to those of combined sulfite.

Any free sulfites in the sample react with 4,4'- (4-aminocyclohexa- 2,5-dienylidene) methyl) dianiline (pararosaniline) dye in the presence of formaldehyde and in acidic medium. The color increase of the sample is directly proportional to the free sulfite concentration.

Kit volume: 400 mL

Method: Two-reagent differential, reading at 670 nm

Limit of linearity: 150 mg/L

Limit of detection: 3 mg/L



## Histamine | Ref. 12829

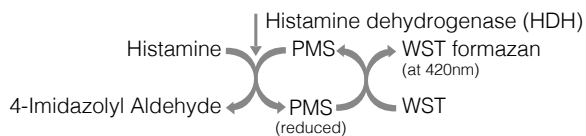
Enzymatic method for the assay of histamine

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Histamine is a biogenic amine, a chemical compound formed by the action of microorganisms on amino acids present in foods. High amounts of histamine in food can cause organoleptic alterations as well as trigger undesirable effects once consumed and therefore histamine concentrations should be controlled. Although it is true that there are currently no global regulations, acceptable limits for histamine concentrations in wines are around 10 ppm.

By means of the coupled reactions described, histamine in the sample yields a colored complex that is quantitated by spectrophotometry.



Kit volume: 100 mL

Method: Two-reagent differential, reading at 420 nm

Limit of linearity: 160 mg/L

Limit of detection: 2,1 mg/L

## Iron | Ref. 12817

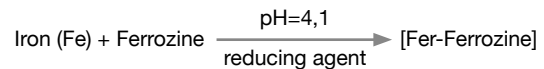
Colorimetric analysis for iron determination

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Metal components in wine can originate in grapes or the machinery used to make wine. A high iron content can cause clouding due to a lack of solubilization, thus affecting the color and clarity of the wines.

Any iron in the sample reacts with 3-(2-pyridyl)-5,6-bis(4-phenylsulfonic)-1,2,4-triazine (ferrozine) sodium salt in acidic medium and in the presence of a reducing agent. The color increase is directly proportional to the iron concentration of the sample.



Kit volume: 100 mL

Method: Two-reagent differential, reading at 560 nm

Limit of linearity: 30 mg/L

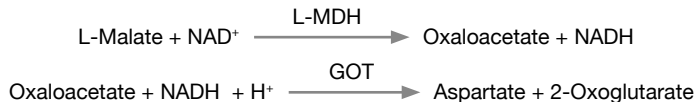
Limit of detection: 0,1 mg/L

# L-Malic Acid | Ref. 12803

## Enzymatic method for L-malic acid determination

### Advantages

- Stable liquid reagent until the expiration date
- Stable working reagent for 4 months
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit



Kit volume: 100 mL

Method: Two-reagent differential, reading at 340 nm

Limit of linearity: 4 g/L

Limit of detection: 0,016 g/L

L-malic acid is responsible for the sharply acidic, green apple flavor in wine. Its fermentation yields L-lactic acid and causes perceived acidity to soften.

L-malic acid in the sample yields NADH (by the following reaction), which can be measured by spectrophotometry. The equilibrium of this reaction moves toward L-malic acid formation. The enzyme glutamate-oxaloacetate transaminase (GOT) causes the equilibrium to shift by eliminating oxaloacetate, which is converted into L-aspartate in the presence of L-glutamate.



## L-Lactic Acid | Ref. 12802

Enzymatic method  
for L-lactic acid determination

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

L-lactic acid is the product of the metabolism of malic acid during the malolactic fermentation. L-lactic acid is perceived as less acidic and softer on the palate compared to malic acid.

L-lactic acid in the sample yields NADH (by the following reaction), which can be measured by spectrophotometry.



Kit volume: 100 mL

Method: Two-reagent differential, reading at 340 nm

Limit of linearity: 3 g/L

Limit of detection: 0,02 mg/L

## Magnesium | Ref. 12878

Colorimetric method for  
the determination of magnesium content

### Advantages

- Stable liquid reagent until the expiration date
- Stable working reagent for 15 days
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Magnesium, along with potassium are essential nutrients for the nutrition of vines. Magnesium helps with the transportation and accumulation of sugars in the grape. Along with other minerals it helps neutralise organic acids in the grape and the must.

The magnesium present in the sample reacts with xylydyl blue in an alkaline medium, producing a coloured complex that can be determined spectrophotometrically. The presence of EGTA in the reagent prevents calcium interference.

Kit volume: 100 mL

Method: Mono-reagent endpoint, reading at 520 nm

Limit of linearity: 240 mg/L

Limit of detection: 9 mg/L

## pH | Ref. 12876

### Colorimetric method for the determination of pH

#### Advantages

- Liquid reagent stable until expiry date
- Dedicated reagents ready for use
- Liquid calibration standards included in the kit

In musts and wines the pH varies depending on the ripeness of the grapes, the concentration of organic acids at the time of harvest, the variety of the grape, the presence and metabolism of micro-organisms and the fermentation temperature etc. The appearance of tartrate precipitates during the wine-making process will alter the final pH of the wine.

The hydrogen ions in the sample alter the pH of the sample/ buffer mix and can be measured spectrophotometrically with the bromophenol blue indicator.

Kit volume:	100 mL
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Method:	Two-reagent differential, reading at 600 nm
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Measurement range:	3,00 a 4,40
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## Polyphenols | Ref. 12815

### Colorimetric analysis for polyphenols determination

#### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Phenol components significantly enhance the antioxidant properties, color and mouthfeel of red wines. The importance of these phenol components in sensory perception requires assay at all stages of the winemaking process.

Any polyphenols in the sample react with Folin-Ciocalteu's reagent in basic medium. The color increase is directly proportional to the polyphenols concentration of the sample.

Polyphenols + Folin-Ciocalteu's Reagent (RF)  $\xrightarrow{\text{pH}=10,9}$  [Polyphenols - FC]

Kit volume:	80 mL
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Method:	Two-reagent endpoint, reading at 670 or 750 nm
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Limit of linearity:	3000 mg/L
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Limit of detection:	60 mg/L
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## Potassium | Ref. 12823

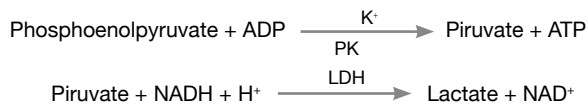
Enzymatic method  
for potassium determination

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

The amount of potassium in grape must varies between 600 and more than 2500 mg/L in certain varieties of red wine. During véraison, soil potassium moves toward the fruit where it forms soluble potassium bitartrate. Alcohol and low temperatures can reduce its solubility, leading to precipitation.

Potassium in the sample consumes NADH (by the following reaction), which can be measured by spectrophotometry.



Kit volume:	80 mL
Method:	Two-reagent differential, reading at 340 nm
Limit of linearity:	1500 mg/L wine   4000 mg/L Most
Limit of detection:	8 mg/L

## Primary Amino Nitrogen (PAN) | Ref. 12807

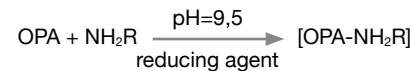
Colorimetric analysis  
for primary amino nitrogen determination

### Advantages

- Stable liquid reagent until the expiration date
- Stable working reagent for 12 months
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Nitrogen compounds (molecules containing a primary amine nitrogen) in must and wine play a key role in fermentation and the potential of microbial stability.

Any molecules in the sample that contain a primary amino nitrogen react with o-phthalaldehyde (OPA) in the presence of a reducing agent in basic medium, yielding a chromogen that is assayed spectrophotometrically.



Kit volume:	100 mL
Method:	Two-reagent differential, reading at 340 nm
Linealidad:	400 mg/L
Limit of detection:	1 mg/L

## Pyruvic Acid | Ref. 12826

Enzymatic method  
for pyruvic acid determination

### Advantages

- Stable liquid reagent until the expiration date
- Stable working reagent for 2 months
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Pyruvic acid is an organic acid naturally present in wine and one of the acids that most influences its body and mouthfeel. Pyruvic acid is a result of the fermentation process and contributes to the organoleptic properties of wine, but must be controlled because selective sulfite-binding shortens the life of the wine.

Pyruvate in the sample yields oxalacetate due to the action of the enzyme known as D-lactate dehydrogenase. This reaction consumes NADH that is oxidized to NAD<sup>+</sup> and the disappearance of the latter can be measured by spectrophotometry.



Kit volume: 100 mL

Method: Two-reagent differential, reading at 340 nm

Limit of linearity: 400 mg/L

Limit of detection: 6 mg/L

## Sucrose / D-Glucose / D-Fructose | Ref. 12819

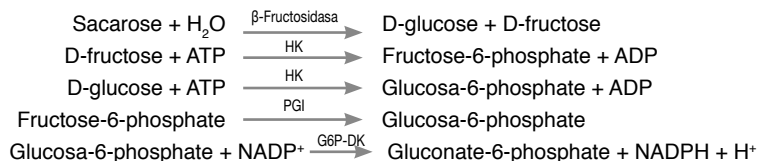
Enzymatic method for sucrose or Sucrose  
/ D-Glucose / D-Fructose determination

### Advantages

- Stable liquid reagent until the expiration date
- Stable working reagent for 3 months
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Precise analysis of sucrose or total sugar is important for many winemakers in two winemaking operations. Sparkling wine (cava, champagne, etc.) production: adding sucrose once alcoholic fermentation has been carried out in order to achieve a secondary fermentation that produces CO<sub>2</sub>, which is retained in the wine.

Sucrose, D-fructose and D-glucose in the sample generate NADPH (by the following reaction), which can be measured by spectrophotometry.



Kit volume: 60 mL

Method: End-point/two-reagent differential, reading at 340 nm

Limit of linearity: Sucrose 4 g/L, Suc./D-Gluc./D-Fruc. 8 g/L

Limit of detection: Sucrose 0,08 g/L, Suc./D-Gluc./D-Fruc. 0,07 g/L

## Tartaric Acid | Ref. 12808

Colorimetric analysis  
for tartaric acid determination

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Tartaric acid is the main acid of wine that can become insoluble, forming various salts. This acid produces the fruity aromas and freshness of wines and is the most commonly used acidifier.

Any tartaric acid in the sample reacts with vanadium salt in acidic medium, forming a colored complex that is assayed by spectrophotometry.



Kit volume: 100 mL

Method: Two-reagent differential, reading at 520 nm

Measurement range: 0,06 a 6 g/L

Limit of detection: 0,06 g/L

## Total Acidity | Ref. 12846

Colorimetric analysis  
for the assay of total acidity

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit

Total acidity should be determined in must to ensure good fermentation, as well as in wine after fermentation because it is a key factor for the storage and stability of wine over time. Low acidity means that microbial alterations and wine with defects and of poorer quality is more likely. Low acidity can cause microbial instability that results in wine defects and overall decrease in quality. Wine should have an adequate total acidity value consistent with the other components to achieve good balance. This value can be between 3 and 7 g/L.

Total acidity is the sum of assayable acids in wine or must, such as malic acid, tartaric acid, lactic acid, etc., except for carbonic acid and sulfurous acid. This reagent determines the total acidity, expressed as g/L of tartaric acid.

Acids in the sample modify the pH in the reaction mixture that, in the presence of the bromothymol blue (BTB) indicator, can be measured spectrophotometrically.

Kit volume: 100 mL

Method: Two-reagent differential, reading at 620 nm

Linealidad: 12 g/L

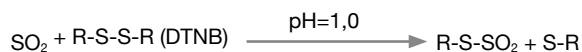
# Total Sulfite

 | Ref. 12806

## Colorimetric analysis for total sulfite determination

### Advantages

- Stable liquid reagent until the expiration date
- Ready-to-use dedicated reagent
- Liquid calibrator included in the kit



Kit volume: 200 mL

Method: Two-reagent differential, reading at 405 nm

Limit of linearity: 400 mg/L

Limit of detection: 1 mg/L

Sulfite is the main preservative of wines and musts, due to its antiseptic properties on yeasts and bacteria; it also has antioxidant properties. According to Council Regulation (EC) No 1493/1999 and Council Regulation (EC) N° 1622/2000, the sulfur dioxide content of wine is limited, as it is considered to be a slightly toxic substance from the point of view of its effects on human physiology.

Total sulfites in the sample react with 5-5'-dithio-2-nitrobenzoic (DTNB) acid in basic medium. Cleavage of the disulfide bond (R-S-S-R) of DTNB by a sulfite molecule yields the 5-mercaptan-2-nitrobenzoate molecule, which absorbs at 405 nm. The color increase of the sample is directly proportional to the total sulfite concentration of the sample.



## Multical | Ref. 12818

### Multiparameter calibrator

MULTICAL is a multiparameter calibrator with five synthetic matrix liquid levels (5 x 10 mL). It contains various analytes at adequate concentrations for the calibration of the measurement procedures.

The traceability of the results in samples to reference materials or systems of higher metrological hierarchy is only ensured when the reagents and measurement procedures recommended by BioSystems are used.

Parameter	U	1	2	3	4	5
Acetic acid	g/L	0,15	0,30	0,60	0,90	1,20
Ammonia	mg/L	23	45	90	135	180
Citric acid	mg/L	45	90	180	270	360
D-Gluconic Acid	g/L	0,20	0,40	0,80	1,20	1,60
D-Glucose	g/L	0,90	1,80	3,60	5,40	7,20
D-Glucose/D-fructose	g/L	0,90	1,80	3,60	5,40	7,20
Glicerol	g/L	0,113	0,225	0,450	0,675	0,900
Ácido D-láctico	mg/L	0,028	0,056	0,113	0,169	0,225
Ácido L-láctico	g/L	0,34	0,68	1,35	2,03	2,70
Ácido L-málico	g/L	0,45	0,90	1,80	2,70	3,60
PAN	mg/L	45	90	180	270	360
Suc./D-gluc./D-fruc.	g/L	0,90	1,80	3,60	5,40	7,20

Traceability: aqueous reference standard

## Ions Multical | Ref. 12841

### Multiparameter calibrator

IONS MULTICAL. 5 levels with 10 mL. Multiparameter calibrator with five synthetic matrix liquid levels that contain various metals at adequate concentrations to calibrate the measurement procedures.

The concentration values assigned to each component and their traceability is ensured by using the reagents and measurement procedures recommended by BioSystems.

Parameter	U	1	2	3	4	5
Calcium	mg/L	20,3	40,5	81,0	121,5	162,0
Copper	mg/L	0,8	1,6	3,2	4,7	6,3
Iron	mg/L	3,4	6,8	13,5	20,3	27,0
Potassium	mg/L	34	68	135	203	270
Magnesium	mg/L	4,5	9,0	18,0	27,0	36,0

Traceability: aqueous reference standard



## Control Wine (white and red) | Ref. 12821 / 12822

### Multiparameter calibrator

Control Wine (white and red) is a wine (10 x 5 mL) that contains various components at adequate concentrations for quality control in laboratories. The product is designed for intra-laboratory quality control and is supplied with acceptable value intervals.

Traceability is only ensured when the reagents and measurement procedures recommended by BioSystems are used.

Component	U
Acetic acid	g/L
Ammonia	mg/L
Iron	mg/L
D-Gluconic acid	g/L
D-glucose / D-fructose	g/L
D-glucose	g/L
Glycerol	g/L
L-Lactic acid	g/L
L-Malic acid	g/L
Primary Amine Nitrogen	mg/L
Polyphenols	mg/L
Tartaric acid	g/L
Citric acid	mg/L



## Sulfite Control | Ref. 12827

Sulfite (I and II) Control is a synthetic liquid material that contains stabilized sulfite at adequate concentrations for quality control in laboratories. It does not contain preservatives that could interfere with the measurements.

The concentration values assigned to each level are shown in the attached tables. The values are traceable to the unit of mass. Traceability is ensured only by using the measurement reagents and procedures recommended by BioSystems. The acceptable ranges suggested have been prepared based on prior experience in interlaboratory variability and are provided only as a guideline, as each laboratory should establish its own precision parameters.

Component	Level	Value	Limits	Units
Sulfite (free & total)	I	40	36-44	mg/L
	II	80	72-88	mg/L

## High Glucose / Fructose Control | Ref. 18069

BioSystems offers a 200 g/L aqueous standard in order to facilitate work with D-Glucose/D-Fructose techniques that include a pre-dilution.

## Casein | Ref. 14113

### ELISA method

#### Advantages

- Fast, standard method
- High sensitivity
- Liquid reagent, stable until the expiration date
- Easy sample preparation

Casein is an allergenic protein present in cow's milk and dairy products made from cow's milk. The presence of traces of these proteins must be labeled due to the risk it poses to the health of people with allergies, as set forth in the legislation. In addition to foods that naturally contain casein, there may be traces of these proteins in processed foods due to cross-contamination or the use of additives. Caseins are used as clarifier or fining agent in the winemaking process.

Casein reagent is a sandwich enzyme-linked immunosorbent assay (ELISA) for the quantitative analysis of casein traces in samples of wine, juice, cookies, meat products, chocolate and other food products.

Presentation:	96 wells
Method:	Sandwich ELISA, reading at 450 nm
Limit of detection:	0,04 ppm
STD Concentration:	0 - 0,2 - 0,6 - 2 - 6 ppm

## Histamine "High Sensitivity" | Ref. FCE3100

### ELISA method

#### Advantages

- High sensitivity
- Liquid reagent, stable until the expiration date
- Easy sample preparation

Histamine is a biogenic amine present in certain food with high concentrations of protein or foods exposed to fermentation processes. Histamine is created by certain microorganisms that affect the amino acid histidine. Histamine intake by sensitive individuals produces undesirable effects, such as headaches or skin reactions; hence, it should be controlled.

High-sensitivity ELISA of histamine is a competitive enzyme-linked immunoabsorbent assays for the quantitative analysis of histamine in wine, fish, cheese and meat.

Histamine in the sample is quantitatively derivatized to N-acyl-histamine by using an acylating reagent. The microplate wells are coated with histamine. In a first incubation, acylated histamine in the sample or reference standard competes with fixed histamine to bind to anti-histamine antibodies.

Presentation:	96 wells
Method:	Competitive ELISA, reading at 450 nm
Limit of detection:	0,15 ppb
STD Concentration:	0 - 25 - 100 - 250 - 500 ppb

## Lysozyme | Ref. 14122

### ELISA method

#### Advantages

- Fast, standard method
- High sensitivity
- Liquid reagent, stable until the expiration date
- Easy sample preparation

Lysozyme is an allergenic protein contained in eggs and egg products. As set forth by law, the presence of traces of this protein should be labeled due to the risk posed to the health of allergic individuals. In addition to foods that naturally contain lysozyme, there may be traces of this protein in processed foods due to cross-contamination or the use of additives. Lysozyme is used as a preservative in the winemaking process.

Lysozyme reagent is a sandwich enzyme-linked immunosorbent assay (ELISA) for the quantitative analysis of casein traces in wine and cheese samples.

Presentation:	96 wells
Method:	Sandwich ELISA
Limit of detection:	2 ppb
STD Concentration:	0 - 25 - 100 - 250 - 500 ppb

## Ovalbumin | Ref. 14125

### ELISA method

#### Advantages

- Fast, standard method
- High sensitivity
- Liquid reagent, stable until the expiration date
- Easy sample preparation

Ovalbumin is an allergenic protein contained in eggs and egg products. As set forth by law, the presence of traces of this protein should be labeled due to the risk posed to the health of allergic individuals. In addition to foods that naturally contain ovalbumin, there may be traces of this protein in processed foods due to cross-contamination or the use of additives. Ovalbumin is used as a clarifier finding agent in the winemaking process.

Ovalbumin reagent is a sandwich enzyme-linked immunosorbent assay (ELISA) for the quantitative analysis of casein traces in wine and food samples.

Presentation:	96 wells
Method:	Sandwich ELISA
Limit of detection:	4 ppb
STD Concentration:	0 - 25 - 100 - 250 - 500 ppb

# Ochratoxin-A ELISA | Ref. 14108 Rapid Test | Ref. 14203

## ELISA Method / Rapid Test

Ochratoxin-A is a nephrotoxic and hepatocarcinogenic microtoxin produced by *Penicillium verrucosum* and *P. viridicatum* as well as by several species of *Aspergillus*, such as *A. ochraceus* in warm tropical areas of the world. Ochratoxin-A has been found in several cereals and other plant products, in coffee, wine and animal feed.

The legally-established maximum levels in Europe for ochratoxin-A depend on whether the food is being used directly for human consumption or as a raw material for prepared products, varying between 2 and 20 µg/kg (ppb).



### Advantages of ELISA

- High sensitivity
- Validated for wine

The ELISA Ochratoxin-A kit is a competitive enzyme immunoassay for quantitative analysis of the Ochratoxin-A in foods and feeds (corn, rice, wheat, sorghum, barley, oat, rye, coffee, cacao, pulses and wine).

### Advantages of Rapid Test

- Results in 10 minutes
- Easy to use
- Includes everything necessary for on-site analysis
- Low cost
- High sensitivity
- Detection limits in line with current legislation

The Ochratoxin-A Rapid Test is a competitive enzyme immunoassay on nitrocellulose for screening Ochratoxin-A in wines (white, rosé and red)..

Presentation: 96 wells

Method: Competitive ELISA, reading at 450 nm

Limit of detection: 0,3 ppb

STD Concentration: 0 - 0,0625 - 0,125 - 0,25 - 0,5 - 1 ppb

Presentation: 10 test

Method: Rapid Test (Ezyme immunoassay)

Limit of detection: 0,3 ppb

Y15 / Y25 / Y350 are open analyzers.

In conjunction with the reagent line, the BioSystems Analyzers make it possible to monitor the entire vinification process. The system adjusts to the various sample types that the enologist needs to analyze.



## Technical Specifications | Code 80176



### Optical System

Range of measurement: 0-3.5 A  
all wavelengths  
Wavelengths: 280, 340, 405, 420, 505, 520,  
560, 620, 635, 670, 750 (nm)  
Light Source: LEDs  
Settings: monochromatic and bichromatic

### Thermostat System

Peltier system from 25-40 °C

### Fluidic System

Continuous flow system with peristaltic  
pump incorporated  
Stepper motor pump operation  
Sipping volume can be programmed  
from 100 µL to 5 mL  
Automatic adjustment of sample volumen  
Automatic adjustment of sample position

### Printer Screen and Keyboard

Thermic printer  
Screen: graphic LCD lighted screen 320 x  
240 px  
Keyboard: tactile membrane

### Methods of Calculation

Absorbance  
End Point  
Differential Mode  
Fixed Time  
Kinetic

### Calibration

Factor  
Calibrador  
Curva de calibración

### Calibration Curve

Up to 8 Calibration points  
Up to 3 replicates per point

### Quality Control

2 controls per test  
Levey-Jennings control chart  
Westgard's Rules

### Installation Characteristics

Voltage: 100V-240 V  
Frequency: 50/60 Hz  
Maximum power: 30 W  
Temperature: 10-35 °C  
Max Rel humidity: 75 %  
Height: <2000 m  
Dimensions: 420 x 350 x 216 mm  
Weight: 4 kg

### Accessories

Battery Pack  
- Capacity 2000 mAh  
- Duration: 2 hrs  
0,2, 1 and 10 mm flow quartz cuvette  
10 mm flow glass cuvette  
1 mm glass cuvette + adapter  
10 mm quartz cuvette



## Technical Specifications | Code 83106 | Code 83106c



Random Access automatic analyser.  
Photometric reading directly on the reaction rotor.

<b>Test rate</b>	150 tests/hour (75 results/hour)
<b>Number of rack positions — Y15</b>	4 (samples and/or reagents)
<b>Number of rack positions — Y15c</b>	2 (samples and/or reagents)
<b>Number of samples per rack</b>	24 (multiuse racks)
<b>Number of samples per rack</b>	10 (20 and 50 mL bottles)
<b>Number of cooled reagents — Y15c</b>	10 (20 mL bottles) and 10 (50 mL bottles)
<b>Maximum number of samples/reagents — Y15</b>	72 samples / 30 reagents
<b>Maximum number of samples/reagents — Y15c</b>	48 samples / 30 reagents
<b>Sample tubes</b>	ø13 mm, ø15 mm (maximum height 100 mm)
<b>Standard vial</b>	ø13 mm
<b>Programmable reagent volume — A / B</b>	10 µL - 600 µL / 10 µL - 200 µL
<b>Programmable sample volume</b>	2 µL - 80 µL
<b>Removable methacrylate rotor</b>	
<b>Number of wells in the rotor</b>	120
<b>Automatic pre- and post-dilutions</b>	
<b>Permissible reaction volumes</b>	180 µL - 800 µL
<b>Measurement range</b>	from -0,05 A to 3,6 A
<b>Filter drum configuration</b>	340, 405, 420, 520, 560, 600, 620, 635, 670 (nm)
<b>Dimensions</b>	840 x 670 x 615 (mm) (length x deep x height)
<b>Weight</b>	45 kg



## Technical Specifications | Code 83107



Random Access automatic analyser.  
Photometric reading directly on the reaction rotor.

<b>Test rate</b>	240 tests/hour (120 results/hour)
<b>Number of cooled reagents</b>	30
<b>Positions for uncooled rack</b>	3 (multipurpose rack)
<b>Number of samples per rack</b>	24
<b>Maximum number of samples</b>	10 (20 mL and 50 mL bottles)
<b>Sample tubes</b>	ø13 mm, ø15 mm (maximum height 100 mm) ø13 mm
<b>Number of reagents per rack</b>	10
<b>Max. number of uncooled reagents</b>	20
<b>Reagent bottles</b>	20 mL y 50 mL
<b>Programmable reagent volume – A / B</b>	10 µL - 440 µL / 10 µL - 200 µL
<b>Programmable sample volume</b>	2 µL - 40 µL
<b>Removable methacrylate rotor</b>	
<b>Number of wells</b>	120
<b>Automatic pre- and post-dilutions</b>	
<b>Reaction volume range</b>	180 µL - 680 µL
<b>Measurement range</b>	from -0,05 A to 3,6 A
<b>Filter drum configuration</b>	340, 405, 420, 520, 560, 600, 620, 635, 670 (nm)
<b>Dimensions</b>	1080 x 695 x 510 (mm) (length x deep x height)
<b>Weight</b>	73 kg

# Y200

## Technical Specifications | Code 83020



### Speed

200 tests/hour (200 results/hour)

### Capacity

88 positions:

- 44 sample or 60 mL positions (tube or pediatric well)
- 44 sample or 20 mL positions (tube or pediatric well)

### Sistema Flúidico

RA volume from 90  $\mu$ L to 300  $\mu$ L

RB volume from 10  $\mu$ L to 100  $\mu$ L

Sample volume from 2  $\mu$ L to 40  $\mu$ L

Reaction volume from 180  $\mu$ L to 440  $\mu$ L

Level and clot detector

### Optical System

LED + Hard Coating Filter

Main photodiode + reference photodiode

Wavelengths

340, 405, 420, 430, 505, 520, 560, 600, 620, 635, 750 (nm)

### Other Characteristics

Dimensions 1077 x 690 x 680 (mm)

166 Kg


**400**
**Technical Specifications** | Code 83040

**Speed**

400 tests/hour (400 results/hour)

**Capacity**

135 sample positions  
(90 with automatic barcode reading)

88 reagent bottles (refrigerated)  
Removable blade with 120 reaction cuvettes  
(autowashable)

**Fluid System**

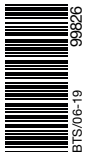
RA volume from 90  $\mu\text{L}$  to 450  $\mu\text{L}$   
RA volume from 10  $\mu\text{L}$  to 300  $\mu\text{L}$   
Sample volume from 2  $\mu\text{L}$  to 40  $\mu\text{L}$   
Reaction volume from 180  $\mu\text{L}$  to 600  $\mu\text{L}$   
Level and clot detector

**Optical System**

LED + Hard Coating Filter  
Main photodiode + reference photodiode  
Wavelengths  
340, 405, 420, 430, 505, 520, 560, 600, 620  
635, 750 (nm)

**Other Characteristics**

Dimensions 1200 x 720 x 1258 (mm)  
210 Kg



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- Certified Management System
- EN ISO 9001
- EN ISO 13485

