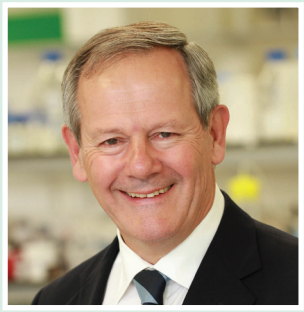
Megazyme
www.megazyme.com

Food, Feed, Fermentation, Biofuels, Wine, Brewing & Dairy Industries

Product Catalogue

Megazyme



Megazyme Test Kits and Reagents

Purity. Quality. Innovation.

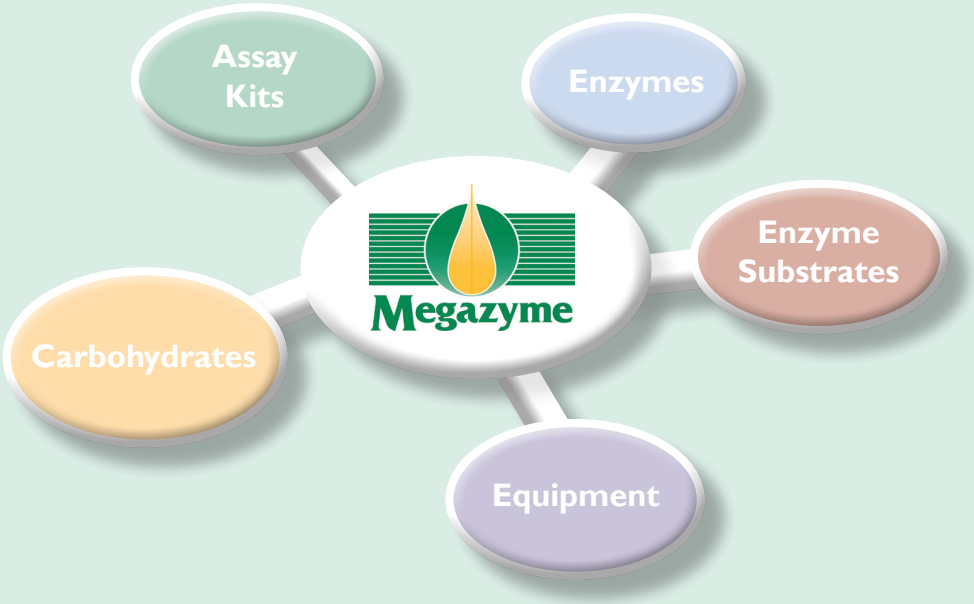
Barry V. McCleary, PhD, DScAgr

Innovative test methods with exceptional technical support and customer service.
The Megazyme Promise.

Megazyme was founded in 1988 with the specific aim of developing and supplying innovative test kits and reagents for the cereals, food, feed and fermentation industries. There is a clear need for good, validated methods for the measurement of the polysaccharides and enzymes that affect the quality of plant products from the farm gate to the final food.

The commitment of Megazyme to "Setting New Standards in Test Technology" has been continually recognised over the years, with Megazyme and founder, Dr McCleary receiving a number of business and scientific awards.

Today, Megazyme is a recognised world leader in the development of high quality, innovative test technology for many industries and offers the complete toolbox for all aspects of carbohydrate research. Over 500 products are available, 80% of which are unique to Megazyme and these are spread across five main categories; Assay kits, Enzymes, Enzyme Substrates, Carbohydrates and Equipment.



Megazyme has its research and manufacturing facilities in Bray, Ireland. Exports account for over 98% of sales with Megazyme currently shipping to 90 countries spread across every continent. To provide the best customer experience possible, we offer worldwide express delivery with time-stamped tracking on all of our orders and any technical queries on our products are answered by our scientist within 48 hours.

All products can be ordered at www.megazyme.com and our website also acts as the ultimate information resource for all Megazyme products. Customers can download a data booklet for every assay kit that outlines clear step-by-step instructions for their use. Data booklets for other product classes contain detailed physico-chemical information from pH and temperature stability ranges for enzymes to NMR spectra and HPLC/IC chromatograms of enzyme substrates or carbohydrates. Product specific Mega-Calc™ Excel™ based calculation tools, certificates of analysis (COAs), material safety data sheets (MSDS) and frequently asked questions (FAQs) can also be found at www.megazyme.com.

Barry V. McCleary

Professor Barry V. McCleary
Chief Executive Officer

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ASSAY KITS…

Principles of Test Procedures

In general terms, enzymes are catalytic proteins that convert one compound into another, and such reactions frequently occur without any visible sign that they have taken place. However, certain enzymatic reactions result in either a "colour" being produced or consumed, and the intensity of the colour change can be measured using a common spectrophotometer.

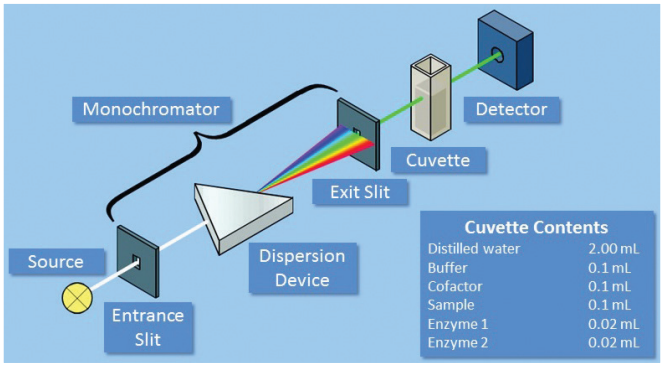


Figure 1. Simplistic representation of enzymatic analysis being conducted using a spectrophotometer.

Invented in the 1950s, the spectrophotometer in its various guises is today one of the most commonly used analytical instruments. The spectrophotometer is a powerful analytical instrument because it can measure changes in absorbance very accurately and quickly. The enzymatic analysis reaction itself is performed in a plastic or glass cuvette that sits between the source of light and the detector inside the spectrophotometer (as depicted simplistically in figure 1). A known amount of light travels through the cuvette and the amount that emerges is quantified by the detector. The change in intensity as the light passes through the reaction solution in the cuvette is recorded as an absorbance reading.

Modern enzymatic analysis test kits generally contain all reagents necessary to perform the assay, e.g. buffer, cofactor(s), trigger enzyme and standard solution, in an easy to use form that is stable for > 2 years (even while in use). During a typical enzymatic analysis, deionised water is mixed with buffer, cofactor and sample. Then an absorbance reading (A_1) is taken just before addition of the "trigger" enzyme (specific for the analyte in question), after which the reaction takes place (see figure 2). When the reaction has finished (i.e. the "endpoint" has been achieved), a second absorbance reading is taken (A_2). The difference between these two absorbance readings (i.e. $A_1 - A_2$) is called the change in absorbance (or ΔA) and is directly related to analyte content. It is this value, after correction with a blank reading (reaction containing no sample), that is used to calculate the concentration of the analyte in the sample (typically as g/L), using a simple factor (e.g. 0.2535 in the case of the the acetic acid AK / PTA format). A sample calculation is shown below.

Typical acetic acid calculation

A_1 (blank) = 1.400 A_2 (blank) = 1.398
A_1 (sample) = 1.420 A_2 (sample) = 0.650

$^{\Delta A}$acetic acid = (A_1 (sample) - A_2 (sample)) - (A_1 (blank) - A_2 (blank))
$^{\Delta A}$acetic acid = (1.420 - 0.650) - (1.400 - 1.398)
= 0.768

Thus the concentration of acetic acid
= 0.768 x .2535
= 0.1947 g/L

When using Megazyme test kits, calculations can either be performed manually as illustrated above or by using a free Excel™-based calculator, called "Mega-Calc™", downloadable from the product page on the Megazyme website (www.megazyme.com).

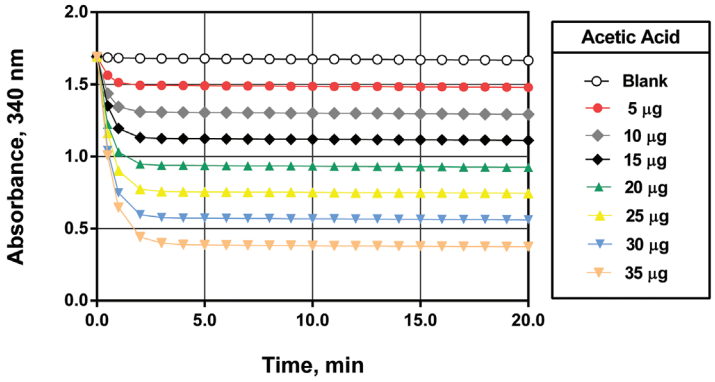


Figure 2. Decrease in absorbance at 340 nm on incubation of 0-35 µg of acetic acid with acetate kinase in the acetic acid AK / PTA format.

Types of Enzymatic Assays

Enzymatic Assays Based on NAD⁺ / NADH / NADP⁺ / NADPH

Megazyme assay kits usually involve enzymes that either directly, or indirectly (via other enzymes), produce or consume a compound called NADH (or NADPH), that although invisible to the human eye, absorbs light strongly at a wavelength of 340 nm (extinction coefficient [ε] = 6300 M^{-1} cm^{-1}). Figure 3 depicts the various types of enzymatic reactions, either consuming or producing NADH (or NADPH), that are employed in many enzymatic test kits (Reaction 1). As can be seen from Figure 3, it is sometimes necessary to include an additional reaction in order to obtain quantitative results (Reaction 2).
This reaction is catalysed by the enzyme diaphorase, in the presence of a compound called INT, which converts the NADH (or NADPH) produced in the first reaction into a red coloured compound called INT-formazan. The resulting change in absorbance at 492 nm can be used to quantify the analyte of interest as discussed previously.

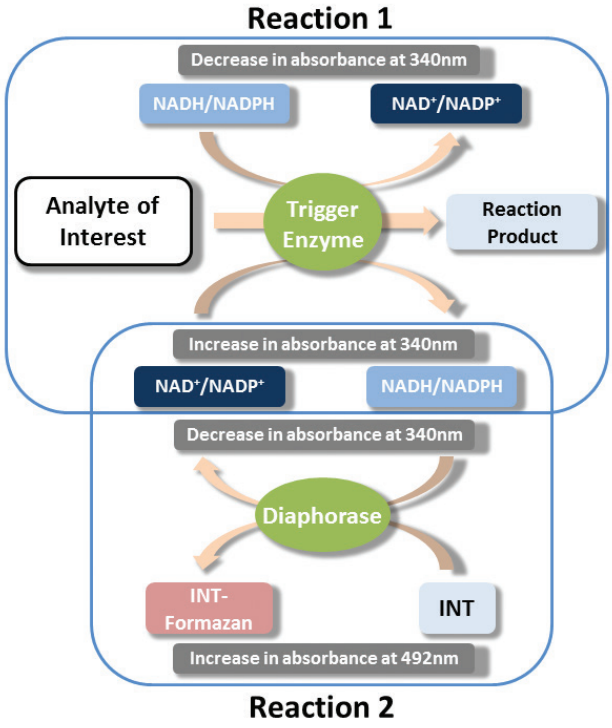


Figure 3. Enzymatic Assays Based on NAD⁺ / NADH / NADP⁺ / NADPH

Enzymatic Assays Based on GOPOD determination

A number of Megazyme test procedures are based on the ability to quantify glucose using the Megazyme Glucose oxidase/Peroxidase system (GOPOD). This can be applied directly to measure glucose in a sample (K-GLUC) but also finds use in the measurement of analytes that can be stoichiometrically converted to glucose (e.g. K-LACSU). The principle of the GOPOD system is shown in Figure 4. In Reaction 1, glucose is converted to glucono-δ-lactone by glucose oxidase with the production of H_2O_2. In Reaction 2, H_2O_2 is used by peroxidase to form a quinoneimine that absorbs at 510 nm. The resulting change in absorbance at 510 nm can be used to quantify the analyte of interest as discussed previously.

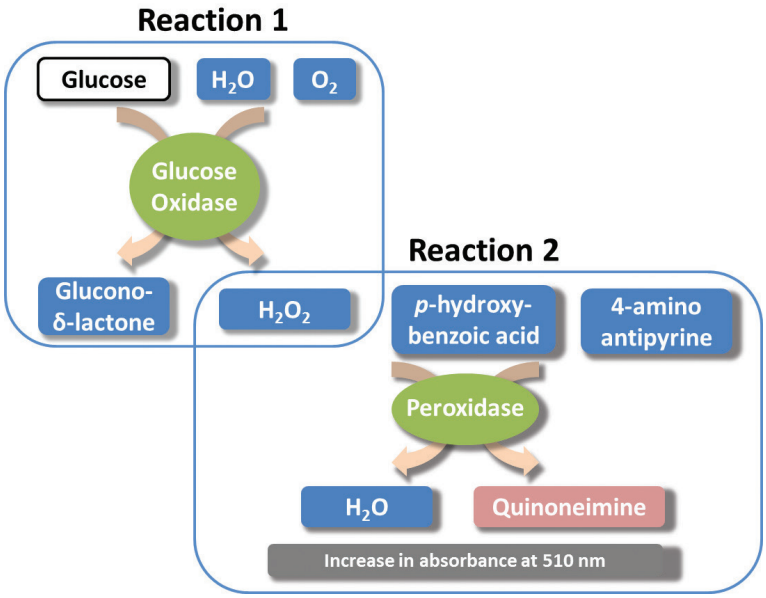


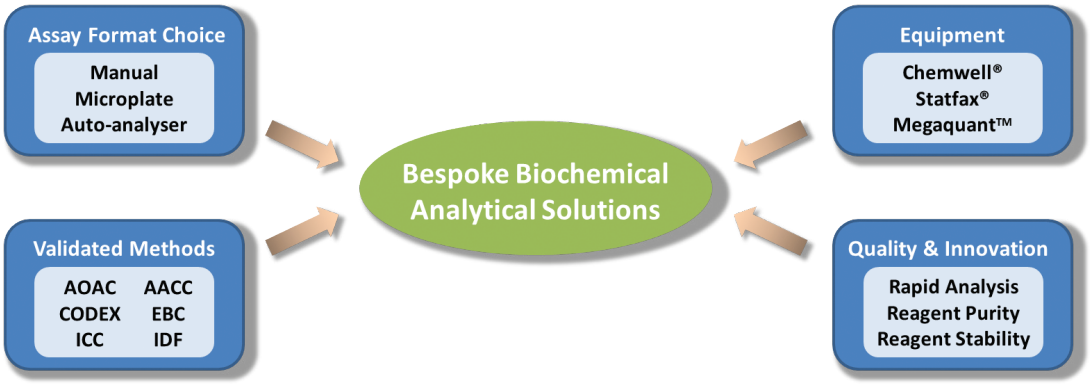
Figure 4. Enzymatic Assays Based on GOPOD determination

Enzymatic Assays Based on Chromogenic Substrates / Colourimetric Oligosaccharides

Certain assay kits involving the measurement of hydrolytic enzyme activity are based on the use of chromogenic substrates (e.g. K-AZOWAX) or colourimetric oligosaccharides (e.g. K-CELLG3). Chromogenic substrates are dyed and cross-linked polysaccharides that release colour upon hydrolysis. The colour released is directly proportional to the enzymatic activity being analysed. Colourimetric oligosaccharides are defined oligosaccharides covalently bound to chromogenic or fluorogenic moiety. These moieties are cleaved by hydrolytic enzymes releasing the desired chromophore or fluorophore which can be measured using a spectrophotometer. The principles of these assays are discussed in detail on page 71.

Complete Solutions for Biochemical Analysis

Megazyme has teamed up with Awareness Technology to offer complete analytical solutions in the form of Megazyme assay kits (assay reagents) and associated equipment required to perform the analyses. Suitable assay formats and equipment combinations are available for customers at every level, from high throughput, large analytical laboratories right down to the smallest analytical facilities having minimal scientific equipment.



Assay kits

While many of the Megazyme assay kits for bio-analysis are based on Boehringer Mannheim Methods of Analysis, continual innovation has enabled the introduction of new developments and improvements. Advanced enzymes offer reduced reaction times, and/or increased stability or alternative biochemical reactions that have been evaluated and implemented. Cofactor stability is enhanced by offering these in a stable tablet form or as improved formulations that provide extended stability in solution. Traditionally, assay kits for bio-analysis were supplied for use in the manual spectrophotometer format. Megazyme has adapted this to offer either a specific assay kit or modified procedure providing a comprehensive range of assays that can be used across the various assay formats:

- **Manual format** - manual format for use with cuvettes and a standard UV/Vis spectrophotometer.
- **Microplate format** - automated or manual format for use with standard 96-well microplates and microplate reader.
- **Auto-analyser format** - automated formats for use with any auto-analyser model.

Examples of the available assay kits covering the various assay formats are outlined below for the analysis of **L-malic acid**, a key parameter measured in wine analysis:

1. **K-LMALAF** is an advanced formulation of the traditional kits offered by other manufacturers for use in the auto-analyser assay format. The advantages of this kit include (i) PVP is incorporated to prevent sample interference (e.g. from tannins in wine), (ii) very stable R1 and R2 reagents, (iii) all reagents are stable for > 2 years during use (both enzymes are supplied as ammonium sulphate suspensions), and (iv) linear calibration (R2 ~ 0.9994) up to 80 µg/mL in final reaction solution (see page 46).

2. **K-LMALQR** is supplied "ready to use" as liquid stable formulations recommended for high throughput use in the microplate or auto-analyser assay formats. The advantages of this kit include (i) no reagent preparation required (ii) very simple format, (iii) very cost effective (iv) PVP is incorporated to prevent sample interference (e.g. from tannins in wine) (iv) reagents are stable for > 2 years (see page 47).

3. **K-LMAL** is an advanced formulation of the traditional kits offered by other manufacturers for use in the manual assay format. The advantages of this kit include (i) PVP is incorporated to prevent sample interference (e.g. from tannins in wine), (ii) all reagents are stable for > 2 years during use (both enzymes are supplied as ammonium sulphate suspensions), (iii) very rapid reaction (~ 3 min) and (iv) an Excel™ based calculator (Mega-Calc™) is available on-line for hassle-free raw data processing (see page 46).

4. **K-LMALMQ** is a novel **manual assay format** used with the **MegaQuant™ Colorimeter** and is recommended for users who do not possess a laboratory and / or analytical expertise. The advantages of this kit include (i) samples do not need to be sent out for contract analysis, (ii) no spectrophotometer is required, (iii) very simple format, (iv) very cost effective, and (v) accurate and reliable with all samples (including red wine) (see page 47).

Equipment

- The **ChemWell® 2910** is a fully automated open system analyser with optimised programmed protocols ready for use with Megazyme assay kits in **auto-analyser assay format**. It is capable of performing 200 biochemistry assays per hour in micro-well strips using a standard 96-well layout. On completion of assays the micro-wells can be automatically washed for re-use and, being equipped with 27 reagent positions and 96 sample positions, this provides the capability to perform continuous tests without intervention.
- The **ChemWell®-T** is a fully automated open system analyser with optimised programmed protocols ready for use with Megazyme assay kits in **auto-analyser assay format.** It is capable of performing 100 biochemistry assays per hour in 1 cm pathlength cuvette strips. Being equipped with 35 combined reagent and sample positions, it is capable of performing 40 tests without intervention. Cuvettes are easy to load and unload and the "continuous loading" capability allows tests to continue with ease.
- Ideally suited to lower throughput users, the **Stat Fax® 4500 Chemistry Analyser** is a compact, economical, standalone spectrophotometer supplied with programmed protocols for an extensive range of the Megazyme assay kits in **manual assay format.** The protocols offer ease of use for the analyst, providing on-board step-by-step instructions and automated calculation of results. In addition, the **Stat Fax® 4500** can be used as a standard spectrophotometer in various modes offering even greater flexibility.
- The **MegaQuant™ Colorimeter** is an extremely affordable alternative that can be used to measure residual sugar (D-fructose and D-glucose) and L-malic acid in wine. This is a basic, handheld colorimeter that can provide access to the measurement of these key parameters of wine quality for those without any laboratory equipment.

Method Validation and Recognition by Official Bodies

Many of the analytical methods developed by Megazyme have become the official reference method recommended by the appropriate regulatory body for the area in question. In the area of dietary fiber for example, the international body that sets guidelines for national governments is called CODEX Alimentarius. Of the 14 methods currently approved by CODEX for the measurement of total dietary fiber and dietary fiber components, four were developed by Megazyme.
The table below shows the official bodies that have approved various Megazyme test procedures. Also shown are their abbreviations which are used from pages 16-62 in the relevant individual assay descriptions.

AIJN	Association of the Industry of Juices and Nectars from Fruits and Vegetables	**IFU**	International Federation of Fruit Juice Producers
AACC	American Association of Cereal Chemists	**IOCCC**	Office International du Cacao, du Chocolat et de la Confiserie
AOAC	Association of Official Analytical Chemists	**ISO**	International Standard Organisation
ASBC	American Society of Brewing Chemists	**IUPAK**	International Union of Pure and Applied Chemistry
CCFRA	Campden & Chorleywood Food Research Association Group	**JECFA**	Joint FAO / WHO Expert Committee on Food Additives
CODEX	CODEX Alimentarius	**MEBAK**	Central European Brewing Committee for Analysis
DIN	Deutsche Industrie Norm (German Standard)	**NBN**	Norme Belge (Belgian Standard)
EBC	European Brewery Convention	**NEN**	Nederlandske Norm (Dutch Standard)
EEC	Council of European Communities	**NF**	Normes Françaises (French Standard)
EN	European Norms	**NMKL**	Nordisk Metodikkomité for Næringsmidler (Nordic Committee of Food Analysis)
GOST	GOSSTANDART (State Committee of the Russian Federation for Standardisation and Metrology)	**OIV**	Office International de la Vigne et du Vin (International Wine Office)
ICC	International Association for Cereal Science and Technology	**RACI**	Royal Australian Chemical Institute
ICUMSA	International Commission for Uniform Methods of Sugar Analysis	**UKMBI**	United Kingdom Milling and Baking Industries
IDF	International Dairy Federation		

ASSAY KITS

Cat. No.	Product
K-ACHYD	Acetaldehyde
K-ACETAF	Acetic Acid (ACS; analyser format)
K-ACET	Acetic Acid (ACS; manual format)
K-ACETAK	Acetic Acid (AK; analyser format)
K-ACETGK	Acetic Acid (ADP-GK format) NEW
K-ACETRM	Acetic Acid (AK; rapid manual format)
K-AMIAR	Ammonia (Rapid)
K-CERA	α-Amylase (Ceralpha method)
K-AMYLSD	α-Amylase (Sprout damaged) NEW
R-AMHR4	Amylase HR Reagent - 4 Vials
R-CAAR4	Ceralpha; α-Amylase Reagent - 4 Vials
K-BETA3	β-Amylase (Betamyl-3 method)
R-BAMR3	Betamyl-3; β-Amylase Assay Reagent - 4 Vials
K-AMYL	Amylose/Amylopectin
K-AMG	Amyloglucosidase NEW
R-AMGR3	Amyloglucosidase Assay Reagent - 4 Vials
K-ARAB	Arabinan
K-ARGA	L-Arabinose / D-Galactose (Rapid) NEW
K-LARGE	L-Arginine / Urea / Ammonia (Rapid)
K-ASCO	L-Ascorbic Acid (L-Ascorbate)
K-ASNAM	L-Asparagine / L-Glutamine / Ammonia (Rapid)
K-ASPTM	Aspartame
K-ACHDF	Available Carbohydrates / Dietary Fiber
K-CELLG3	*endo*-Cellulase NEW
R-CELLFLR	Cellaflour (Cellulase Assay Reagent) NEW
K-CITR	Citric Acid
K-ETOH	Ethanol
K-TDFR	Fiber (Total Dietary Fiber)
K-INTDF	Fiber (Integrated Total Dietary Fiber) NEW
K-TDFC	Fiber Controls (Total Dietary Fiber)
K-FORM	Formic Acid
K-FRUCHK	Fructan (Hexokinase format)
K-FRUC	Fructan (PAHBAH format)
K-FRUGL	D-Fructose / D-Glucose
K-FRGLQR	D-Fructose / D-Glucose (Liquid Ready Reagents)
K-FRGLMQ	D-Fructose / D-Glucose (*MegaQuant*™ format)
K-FUCOSE	L-Fucose
K-GALM	Galactomannan (Carob or guar)
K-BGLU	β-Glucan (Barley & oat; mixed linkage)
K-YBGL	β-Glucan (Yeast & mushroom)
K-EBHLG	β-Glucan (Yeast-enzymatic)
K-MBGL	β-Glucanase (Malt & microbial)
K-GLUM	Glucomannan
K-GATE	D-Gluconate / D-Glucono-δ-lactone
K-GAMINE	D-Glucosamine (D-Glucosamine sulphate)
K-GLUC	D-Glucose (GOPOD format)
R-GLC4	Glucose Determination Reagent
K-GLUHK	D-Glucose (Hexokinase format)
K-GLOX	Glucose Oxidase
K-URONIC	D-Glucuronic Acid/D-Galacturonic Acid

Cat. No.	Product
K-AGLUA	α-Glucuronidase NEW
K-GLUT	L-Glutamic Acid (MSG)
K-GLNAM	L-Glutamine / Ammonia (Rapid)
K-GCROL	Glycerol
K-GCROLGK	Glycerol (ADP-GK format)
K-HDBA	D-3-Hydroxybutyric Acid
K-INOSL	*myo*-Inositol NEW
K-ISOC	D-Isocitric Acid
K-DATE	D-Lactic Acid
K-DLATE	D- / L-Lactic Acid
K-LATE	L-Lactic Acid
K-LACGAR	Lactose / D-Galactose (Rapid)
K-LACSU	Lactose / Sucrose / D-Glucose
K-LACTUL	Lactulose
K-LDPU	Limit-Dextrinase / Pullulanase AVAILABLE SOON
K-DMAL	D-Malic Acid
K-LMAL	L-Malic Acid
K-LMALAF	L-Malic Acid (Analyser format)
K-LMALQR	L-Malic Acid (Liquid Ready Reagents)
K-LMALMQ	L-Malic Acid (*MegaQuant*™ format)
K-MALTA	Malt Amylase
K-MASUG	Maltose / Sucrose / D-Glucose
K-MANOL	D-Mannitol / L-Arabitol
K-MANGL	D-Mannose / D-Fructose / D-Glucose
K-PECID	Pectin Identification
K-PHYT	Phytic Acid (Total Phosphorus)
K-PANOPA	Primary Amino Nitrogen (NOPA)
K-PYRUV	Pyruvic Acid
K-RAFGA	Raffinose / D-Galactose
K-RAFGL	Raffinose / Sucrose / D-Glucose
K-RHAMNOSE	L-Rhamnose NEW
K-SORB	D-Sorbitol / Xylitol
K-SDAM	Starch Damage
K-RSTAR	Starch (Resistant Starch)
K-RSTCL	Starch Controls (Resistant Starch)
K-TSTA	Starch (Total Starch; GOPOD format)
K-TSHK	Starch (Total Starch; Hexokinase format) NEW
K-TSCK	Starch Controls (Total Starch)
K-SUCC	Succinic Acid
K-SUFRG	Sucrose / D-Fructose / D-Glucose
K-SUCGL	Sucrose / D-Glucose
K-TSULPH	Sulphite (Total SO_2)
K-ETSULP	Sulphite (Total SO_2; Enzymatic)
K-SULPH	Sulphite (Total & Free SO_2)
K-TART	Tartaric Acid
K-TREH	Trehalose
K-URAMR	Urea / Ammonia (Rapid)
K-AZOWAX	Xylanase (Azo-Wax format)
K-XYLS	Xylanase (Xylazyme AX format)
K-XYLOSE	D-Xylose

Food Industry Test Kits

Analyte	Cat. No.	Analyte Significance	Advantages of Megazyme Test Kits
Acetic Acid	K-ACETRM K-ACETAK K-ACETGK	Common food component	K-ACETAK (auto) / K-ACETRM (manual) are very rapid acetate kinase (AK) based kits with excellent linearity. K-ACETGK is a new rapid, auto-analyser assay kit employing AK and phosphotransacetylase. Stable reagents
Ammonia	K-AMIAR	Common food component	K-AMIAR has a very rapid reaction rate (~ 3 min at room temperature). Manual and auto-analyser applications
Amylose / Amylopectin	K-AMYL	Ratio of these components affects the rate of digestion and utilisation of starch	Novel kit, stable reagents
L-Asparagine / L-Glutamine / Ammonia	K-ASNAM	Acrylamide precursors in the production of fried, roasted, toasted potato or other food products	Novel product, enabling all three analytes to be determined in less than 20 min. Manual and microplate format procedures given
L-Ascorbic Acid	K-ASCO	Naturally found in fruits and vegetables, or supplemented in processed foods	Rapid reaction, stable reagents
Available Carbohydrates / Dietary Fiber	K-ACHDF	Sugars rapidly digested and absorbed, and dietary fibre	Novel procedure, stable reagents
β-Glucan (Mixed linkage)	K-BGLU	Major cell-wall polysaccharide of barley and oats	Rapid reaction, stable reagents, only enzymatic kit available. AOAC Method 995.16; AACC Method 32-23.01; ICC Standard No. 166; RACI Standard Method
Citric Acid	K-CITR	Common food component / additive	Ideal for manual and auto-analyser applications
Ethanol	K-ETOH	Found in small amounts in many foods	Rapid reaction, stable reagents (AlDH supplied as a stable suspension)
Fructan	K-FRUC K-FRUCHK	Common component in many foods such as onions and seeds	Novel assays, rapid reaction, stable reagents; AOAC Method 999.03; AACC Method 32-32.01
D-Fructose / D-Glucose	K-FRUGL K-FRGLMQ K-FRGLQR	Very common food sugars, e.g. from high fructose corn syrup supplementation	Ideal for manual and auto-analyser applications. Stable reagents. Choice of spectrophotometric or simple colorimeter formats
D-Gluconic Acid	K-GATE	Food additive	Rapid reaction, stable reagents
D-Glucose	K-GLUC K-GLUHKR/L	Common food component, very important in certain situations, e.g. diabetic products	Choice of simple formats available, based either on glucose oxidase / peroxidase, or hexokinase / G-6-PDH
L-Glutamic Acid	K-GLUT	Common natural food component, e.g. in cheese and tomatoes, or added as a flavouring agent, e.g. as monosodium glutamate (MSG)	Diaphorase supplied as a stabilised suspension rather than a lyophilised powder, thus less wasted enzyme
Glycerol	K-GCROL K-GCROLGK	Common food component, or added as a sweetener or to improve "mouth feel"	Novel tablet format offers superior stability, rapid reactions
D-Lactic Acid	K-DATE K-DLATE	Quality indicator of fruit and vegetable products	Rapid reaction, stable reagents
L-Lactic Acid	K-LATE	Quality indicator of fruit, vegetable and egg products	Rapid reaction, stable reagents. Ideal for manual and auto-analyser applications
Lactose	K-LACGAR K-LACSU	Common processed food component, exact amount important in "lactose free" products	Very rapid reaction for K-LACGAR (~ 5 min even at room temperature), stable reagents
Maltose	K-MASUG	Common food component	Rapid reaction, stable reagents
Resistant Starch	K-RSTAR	Starch that is not digested in the small intestine of monogastric animals	Only kit available. Rapid and robust. AOAC Method 2002.02; AACC Method 32-40.01
Sucrose	K-SUFRG K-SUCGL	Common food component	Choice of simple formats available, based either on glucose oxidase / peroxidase, or hexokinase / G-6-PDH
Sweeteners	K-ASPTM K-MANOL K-SORB	Aspartame, D-mannitol, D-sorbitol and xylitol are common sweeteners found in a variety of foods	1. K-ASPTM - novel method, only test kit available 2. K-MANOL - new method, only test kit available 3. K-SORB - diaphorase supplied as a stabilised suspension rather than a lyophilised powder, thus less wasted enzyme
Total Dietary Fiber	K-TDFR K-INTDF	Carbohydrate not digested in small intestine	1. K-TDFR: AOAC Methods 985.29, 991.42, 991.43 & 993.19; AACC Methods 32-05.01, 32-06.01, 32-07.01, 32-21.01, 2. K-INTDF is consistent with the CODEX Alimentarius definition of dietary fiber. AOAC Method 2009.01, 2011.25; AACC Methods 32-45.01 & 32-50.11
Total Starch	K-TSTA K-TSTAHK	Major food component	Rapid assay formats with options of measuring D-glucose with GOPOD reagent or with hexokinase / G-6-PDH. Stable reagents. AOAC Method 996.11; AACC Method 76-13.01; ICC Method No. 168; RACI Standard Method

Feed Industry Test Kits

Analyte	Cat. No.	Analyte Significance	Advantages of Megazyme Test Kits
Acetic Acid	K-ACETRM	Commonly found in feed or fermented feed	K-ACETRM is a rapid, manual assay kit employing AK and phosphotransacetylase. Stable reagents
Ammonia	K-AMIAR	Commonly found in feed or fermented feed	Rapid reaction rate (~ 3 min at room temperature). Ideal for manual and auto-analyser applications. Stable reagents
α-Amylase	K-CERA	A key enzyme in most feeds and plant products	Novel assay employing a defined oligosaccharide substrate. High sensitivity and specificity. AOAC Method 2002.01; AACC Method 22-02.01; ICC Standard Method no. 303; RACI Standard Method; CCFRA Flour Testing Working Group Method 0018
Available Carbohydrates / Dietary Fiber	K-ACHDF	Rapidly and slowly available sugars for digestion or fermentation	Novel procedure, stable reagents
Fructan	K-FRUC	Fructo-oligosaccharides in grasses and grains	Only kit available. Stable reagents; AOAC Method 999.03; AACC Method 32-32.01
D-Fructose / D-Glucose	K-FRUGL K-FRGLMQ K-FRGLQR	Major digestible carbohydrates in feeds	Rapid reaction times, choice of simple formats available, ideal for manual and auto-analyser applications, stable reagents
Galactomannan	K-GALM	Reserve carbohydrate in many legume seeds	Only kit available, stable reagents
β-Glucan (Barley and oats)	K-BGLU	Major cell-wall polysaccharide of barley and oats	Rapid reaction, stable reagents, only enzymatic kit available. AOAC Method 995.16; AACC Method 32-23.01; EBC Methods 3.11.1, 4.16.1 and 8.11.1; ICC Standard No.166; RACI Standard Method
β-Glucanase	K-CELLG3	β-Glucanase in feed	Novel assay employing a defined oligosaccharide substrate. High sensitivity, specificity and stability. Rapid reaction, ideal for manual and auto-analyser applications
β-Glucanase	K-MBGL	Cellulase and β-glucanase levels in feeds	Only kit available, stable reagents. RACI Standard Method
L-Lactic Acid	K-LATE	Commonly found in fermented feed	Rapid reaction, stable reagents. Ideal for manual and auto-analyser applications
Phytic Acid	K-PHYT	Found in most plant materials. Major form of bound phosphate in plant materials	Novel procedure. Rapid reaction, stable reagents
Raffinose / D-Galactose	K-RAFGA	Found in high levels in legume seeds. Causes discomfort and flatulence in pigs	Rapid reaction, stable reagents
Resistant Starch	K-RSTAR	Starch that is not digested in the small intestine of monogastric animals	Only kit available, stable reagents AOAC Method 2002.02; AACC Method 32-40.01,
Total Dietary Fiber	K-TDFR K-INTDF	Carbohydrate not digested in small intestine	1. K-TDFR: AOAC Methods 985.29, 991.42, 991.43 & 993.19; AACC Methods 32-05.01, 32-06.01, 32-07.01, 32-21.01, 2. K-INTDF is consistent with the CODEX Alimentarius definition of dietary fiber. AOAC Method 2009.01, 2011.25; AACC Methods 32-45.01 & 32-50.11
Total Starch	K-TSTA K-TSTAHK	Starch content of grain and feed	Rapid assay formats with options of measuring D-glucose with GOPOD reagent or with hexokinase / G-6-PDH. Stable reagents. AOAC Method 996.11; AACC Method 76-13.01; ICC Method No. 168; RACI Standard Method
***endo*-β-Xylanase**	K-XYLS	β-Xylanase in feed	High sensitivity, stable reagents
***endo*-β-Xylanase**	S-AXBP	β-Xylanase in feed	Sensitive, easy to use, stable reagent
Protease	S-AZCAS	*endo*-Protease added to feed	Easy to use, stable reagent

Fermentation Industry Test Kits

Analyte	Cat. No.	Analyte Significance	Advantages of Megazyme Test Kits
Acetic Acid	K-ACETRM	A common fermentation product	K-ACETRM is a rapid, manual assay kit employing AK and phosphotransacetylase. Stable reagents
Ammonia	K-AMIAR	Commonly measured in fermentation broths	K-AMIAR has a very rapid reaction rate (~ 3 min at room temperature). Ideal for manual and auto-analyser applications. Stable reagents
α-Amylase	K-CERA	A major fermentation product	Novel assay employing a defined oligosaccharide substrate. High sensitivity and specificity. AOAC Method 2002.01; AACC Method 22-02.01; ICC Standard Method no. 303; RACI Standard Method; CCFRA Flour Testing Working Group Method 0018
L-Asparagine / L-Glutamine / Ammonia	K-ASNAM	Common components of animal cell culture media	Novel product, enabling all three analytes to be determined in less than 20 min. Manual and microplate format procedures given
Citric Acid	K-CITR	A product of fermentation	Ideal for both manual and auto-analyser applications. Reconstituted citrate lyase stable for > 6 months at -20°C. Stable reagents
Ethanol	K-ETOH	Produced during alcoholic fermentation	Rapid reaction, stable reagents (AlDH supplied as a stable suspension)
β-Glucanase	K-CELLG3	A major fermentation product	Novel assay employing a defined oligosaccharide substrate. High sensitivity, specificity and stability. Rapid reaction, ideal for manual and auto-analyser applications
β-Glucanase	K-MBGL	A major fermentation product	Rapid reaction, stable reagents; RACI Standard Method
D-Glucose	K-GLUC K-GLUHK	Common component of fermentation broths	Rapid reaction, stable reagents
Glucose Oxidase	K-GLOX	A major fermentation product	Rapid reaction, simple format, stable reagents
L-Glutamine / Ammonia	K-GLNAM	Common components of animal cell culture media	Simple and rapid test kit gives values for ammonia and L-glutamine
Glycerol	K-GCROL K-GCROLGK	A product of fermentation	Rapid reactions, stable reagents
L-Lactic Acid	K-LATE	Produced predominantly from L-malic acid during malolactic fermentation	Rapid reaction, stable reagents. Ideal for manual and auto-analyser applications
L-Malic Acid	K-LMALR K-LMALAF K-LMALMQ K-LMALQR	Common component of fruits	All kits contain PVP to prevent tannin inhibition. 1. K-LMALR/L (manual) rapid reaction 2. K-LMALAF (auto) rapid reaction, excellent linearity 3. K-LMALMQ (manual, colorimeter based) 4. K-LMALQR (auto) liquid ready reagents
Succinic Acid	K-SUCC	Wine acid produced during fermentation	Rapid reaction (~ 6 min at room temperature), stable reagents
Sucrose	K-SUFRG K-SUCGL	Added to increase the amount of alcohol. Use only permitted in certain situations	Choice of simple formats available, based either on glucose oxidase / peroxidase, or hexokinase / G-6-PDH
Urea	K-URAMR	Source of Yeast Available Nitrogen (YAN) and precursor of the carcinogen ethyl carbamate. Over-supplementation with diammonium phosphate (DAP) can result in elevated levels	Simple, very rapid (both urea and ammonia measured in < 10 min at room temperature) and sequential / efficient (only one cuvette required per sample)
α-Amylase	T-AMZ200	A product of fermentation	Rapid reaction, stable reagent AACC Method 22.05; RACI Standard Method
***endo*-Arabinanase**	T-ARZ200	A product of fermentation	Rapid reaction, stable reagent
β-Glucanase	S-ABG100	A product of fermentation	Rapid reaction, stable reagent
Pullulanase	S-RPUL	A product of fermentation	Rapid reaction, stable reagent
***endo*-β-Xylanase**	S-AXBP	A product of fermentation	Rapid reaction, stable reagent

Wine Industry Test Kits

Analyte	Cat. No.	Analyte Significance	Advantages of Megazyme Test Kits
Acetaldehyde	K-ACHYD	A sensory compound that adds flavour and complexity, but spoils wine at high concentrations	AcDH supplied as a stabilised solution rather than a lyophilised powder, thus less wasted enzyme
Acetic Acid	K-ACET K-ACETAF K-ACETAK K-ACETRM K-ACETGK	A sensory compound that adds flavour and complexity in small amounts, but spoils wine at high concentrations. Produced naturally by yeast in small amounts and by spoilage organisms such as *Acetobacter aceti* in large quantities. This is the predominant of the acids comprising ~ 85% volatile acidity (VA)	All kits contain PVP to prevent tannin inhibition. K-ACET (manual, efficient) contains stable ACS suspension. K-ACETAF (auto) used to prepare very stable R1 and R2. K-ACETAK (auto) / K-ACETRM (manual) are very rapid acetate kinase (AK) based kits with excellent linearity. K-ACETGK is a new rapid, auto-analyser assay kit employing AK and phosphotransacetylase. Stable reagents
Ammonia	K-AMIAR K-LARGE	Most important inorganic source of Yeast Available Nitrogen (YAN)	Novel enzyme employed is not inhibited by tannins, endpoint reaction time ~ 3 min. Ideal for manual and auto-analyser applications
L-Arginine	K-LARGE	Most important amino acid in grape juice with respect to YAN	Simple and rapid test kit gives sequential values for ammonia, urea and L-arginine. No tannin inhibition
L-Ascorbic Acid	K-ASCO	Present naturally in grapes and can be added as an anti-oxidant	Rapid reaction, stable reagents
Citric Acid	K-CITR	Naturally present in small amounts; large amounts indicate addition for acidification (EU limit is 1 g/L)	Ideal for both manual and auto-analyser applications. Reconstituted citrate lyase stable for > 6 months at -20°C. Stable reagents
Ethanol	K-ETOH	Produced during alcoholic fermentation. Amounts > 17.5% (v/v) indicate supplementation	Rapid reaction, stable reagents (AlDH supplied as a stable suspension)
D-Fructose / D-Glucose	K-FRUGL K-FRGLMQ K-FRGLQR	Grape quality indicator. One of the two principle fermentable sugars of grape juice	Contains PVP to prevent tannin inhibition. Ideal for manual and auto-analyser use. Stable reagents
D-Gluconic Acid	K-GATE	Grape quality indicator for the production of certain wines	Rapid reaction, stable reagents
Glycerol	K-GCROL K-GCROLGK	Quality indicator of finished wine, important for "mouth feel"	Novel tablet format offers superior stability, rapid reaction
D-Lactic Acid	K-DATE K-DLATE	Produced predominantly by lactic acid spoilage bacteria	Rapid reaction, stable reagents
L-Lactic Acid	K-LATE K-DLATE	Produced predominantly from L-malic acid during malolactic fermentation	Rapid reaction, stable reagents. Ideal for manual and auto-analyser applications
D-Malic Acid	K-DMAL	Only present in significant quantities in adulterated wine	D-MDH supplied as a stabilised suspension rather than a lyophilised powder, thus less wasted enzyme
L-Malic Acid	K-LMALR K-LMALAF K-LMALMQ K-LMALQR	Grape quality indicator. Very important grape acid, converted to less acidic L-lactic acid during malolactic fermentation	All kits contain PVP to prevent tannin inhibition. 1. K-LMALR/L (manual) rapid reaction 2. K-LMALAF (auto) rapid reaction, excellent linearity 3. K-LMALMQ (manual, colorimeter based) 4. K-LMALQR (auto) liquid ready reagent
Primary Amino Nitrogen (NOPA)	K-PANOPA	Primary amino nitrogen (PAN) is the most important organic source of YAN	Novel kit, rapid reaction, stable reagents, simple format
D-Sorbitol	K-SORB	High levels indicate addition of fruit	Diaphorase supplied as a stabilised suspension rather than a lyophilised powder, thus less wasted enzyme
Succinic Acid	K-SUCC	Wine acid produced during fermentation	Rapid reaction (~ 6 min even at room temperature), stable reagents
Sucrose	K-SUFRG K-SUCGL	Added to increase the amount of alcohol. Use only permitted in certain situations	Choice of simple formats available, based either on glucose oxidase / peroxidase, or hexokinase / G-6-PDH
Sulphite	K-SULPH K-TSULPH K-ETSULPH	Sulphites are used as an essential additive in the control of microbial contamination during aging and also to protect the wine against detrimental "oxidative and enzymatic browning"	Choice of simple formats available, based either on liquid ready reagent chemical reactions (K-SULPH & K-TSULPH) or an enzymatic reaction (K-ETSULPH). Stable reagents
Tartaric Acid	K-TART	Occurs naturally in grapes and is one of the most prevalent organic acids. Key indicator of total (titratable) acidity (TA)	Stable liquid ready reagents. Simple, rapid chemical reaction for manual, auto-analyser and microplate formats
Urea	K-URAMR	Source of YAN and precursor of the carcinogen ethyl carbamate. Over-supplementation with DAP can result in elevated levels	Simple, very rapid (both urea and ammonia measured in < 10 min at room temperature) and sequential / efficient (only one cuvette required per sample)

Brewing Industry Test Kits

Analyte	Cat. No.	Analyte Significance	Advantages of Megazyme Test Kits
α-Amylase	K-CERA	A key indicator of malt quality	Novel assay employing a defined oligosaccharide substrate. High sensitivity and specificity. AOAC Method 2002.01; AACC Method 22-02.01; ICC Standard Method no. 303; RACI Standard Method; CCFRA Flour Testing Working Group Method 0018
β-Amylase	K-BETA3	A key indicator of malt quality	Only kit available. Stable reagents; RACI Standard Method
β-Glucan (Barley and oats)	K-BGLU	Major cell-wall polysaccharide of barley and oats	Rapid reaction, stable reagents, only enzymatic kit available. AOAC Method 995.16; AACC Method 32-23.01; EBC Methods 3.11.1, 4.16.1 and 8.11.1; ICC Standard Method No. 166; RACI Standard Method
β-Glucanase	K-MBGL	β-Glucanase level in malt	Rapid reaction, stable reagents, only enzymatic kit available; RACI Standard Method
D-Glucose	K-GLUC K-GLUHKR/L	Major component of fermentation mixture	Rapid reaction, stable reagents
Malt Amylase	K-MALTA	Measurement of α-/β-amylase. Key indicators of malt quality	Combination of both K-CERA and K-BETA3
Total Starch	K-TSTA K-TSTAHK	Starch content of grain and feed	Rapid assay formats with options of measuring D-glucose with GOPOD reagent or with hexokinase / G-6-PDH. Stable reagents. AOAC Method 996.11; AACC Method 76-13.01; ICC Method No. 168; RACI Standard Method
Alpha-Amylase	T-AMZBG200	Allows measurement of α-amylase in pre-harvest sprouted barley	Novel procedure. Rapid reaction, stable reagent
β-Glucanase	T-BGZ200	Key enzyme in hydrolysis of malt β-glucans	Novel substrate. Rapid reaction, stable reagent; RACI Standard Method
Limit-Dextrinase	T-LDZ200	Key enzyme in hydrolysis of 1,6-linkages in starch and branched malto-dextrins	Novel substrate. Rapid reaction, stable reagent; RACI Standard Method
***endo*-β-Xylanase**	T-XAX200	Key enzyme in hydrolysis of malt xylans	Novel substrate. Rapid reaction, stable reagent

Analyte	Cat. No.	Analyte Significance	Advantages of Megazyme Test Kits
Acetaldehyde	K-ACHYD	One of the most important aroma compounds in yogurt, responsible for the characteristic taste. Also formed in milk during storage	AlDH supplied as a stabilised solution rather than a lyophilised powder, thus less wasted enzyme. Stable reagents
Acetic Acid	K-ACET K-ACETAF K-ACETAK K-ACETRM K-ACETGK	Fermentation product of yogurt and cheese	All kits contain PVP to prevent tannin inhibition. K-ACET (manual, efficient) contains stable ACS suspension. K-ACETAF (auto) used to prepare very stable R1 and R2. K-ACETAK (auto) / K-ACETRM (manual) are very rapid acetate kinase (AK) based kits with excellent linearity. K-ACETGK is a new rapid, auto-analyser assay kit employing AK and phosphotransacetylase. Stable reagents
Ammonia	K-AMIA K-AMIAR	Important indicator of the hygienic quality (microbial load) of milk	K-AMIAR has a very rapid reaction rate (~ 3 min at room temperature). Ideal for manual and auto-analyser applications, stable reagents
L-Ascorbic Acid	K-ASCO	Antioxidant present in dairy products. Permitted additive	Rapid reaction, stable reagents
Aspartame	K-ASPTM	Common milkshake and yogurt sweetener	Rapid reaction, stable reagents, only enzymatic kit available
Citric Acid	K-CITR	Important quality indicator of milk, especially for butter and cheese production. Permitted additive	Ideal for both manual and auto-analyser applications. Reconstituted citrate lyase stable for > 6 months at -20°C, stable reagents
Ethanol	K-ETOH	Produced during the fermentation of kefir	Rapid reaction, stable reagents (AlDH supplied as a stable suspension)
Formic Acid	K-FORM	Minor acid in dairy products	FDH supplied as a stabilised suspension rather than a lyophilised powder, thus less wasted enzyme, stable reagents
D-Fructose / D-Glucose	K-FRUGL K-FRGLMQ	Common milkshake and yogurt sweetener	Rapid reaction times, choice of simple formats available, ideal for manual and auto-analyser applications, stable reagents
D-Gluconic Acid	K-GATE	Weak organic acid found in dairy products. High levels found in certain cheeses	Rapid reaction, stable reagents
D-Glucose	K-GLUC K-GLUHKR/L	Low levels expected in unprocessed / unadulterated milk and in cheese. Useful marker when producing lactose depleted dairy products	Choice of simple formats available, based either on glucose oxidase / peroxidase, or hexokinase / G-6-PDH, stable reagents
L-Glutamic Acid	K-GLUT	Found in high concentrations, especially in cheese	No wasted diaphorase solution (stable suspension supplied), stable reagents
D-Lactic Acid	K-DATE	Quality indicator of milk, yogurt and cheese	Rapid reaction, stable reagents
L-Lactic Acid	K-LATE	Quality indicator of fresh milk. High levels in yogurt and cheese	Rapid reaction, stable reagents. Ideal for manual and auto-analyser applications
D-/L-Lactic Acid	K-DLATE	Quality indicator of fresh milk, yogurt and cheese	Rapid reaction, flexible concurrent format, stable reagents
Lactose / D-Galactose	K-LACGAR	Key quality (value) indicator of milk	Very rapid reaction (~ 5 min even at room temperature), stable reagents
D-Sorbitol / Xylitol	K-SORB	Dairy product sweetener	No wasted diaphorase solution (stable suspension supplied), stable reagents
Succinic Acid	K-SUCC	Minor dairy acid	Rapid reaction (~ 6 min even at room temperature), stable reagents
Sucrose	K-SUFRG K-SUCGL	Not present naturally in dairy products	Choice of simple formats available, based either on glucose oxidase / peroxidase, or hexokinase / G-6-PDH, stable reagents
Urea	K-URAMR	Quality indicator of milk, especially that used for cheese production. Used as a metabolic marker of bovine blood urea levels	Simple, very rapid (both urea and ammonia measured in < 10 min at room temperature) and sequential / efficient (only one cuvette required per sample)

OVERVIEW OF ASSAY METHODS

Acetaldehyde — Cat. No. K-ACHYD

UV-method for the determination of Acetaldehyde in foodstuffs, beverages and other materials

Principle:

(aldehyde dehydrogenase)

(1) Acetaldehyde + NAD^+ + H_2O → acetic acid + NADH + H^+

Kit size:	50 assays (manual) / 500 (microplate) / 500 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 4 min
Detection limit:	0.18 mg/L
Application examples:	Wine, champagne, beer, liqueurs, brandy, dairy products (e.g. yogurt), bread, fruit juices, soft drinks, cocoa, vegetable and fruit products, coffee, and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by MEBAK

Advantages

- No wasted aldehyde dehydrogenase solution (stable suspension supplied)
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

Acetic Acid (Acetyl-CoA synthetase analyser format) — Cat. No. K-ACETAF

Analyser format UV-method for the determination of Acetic Acid in foodstuffs, beverages and other materials

Principle:

(acetyl-CoA synthetase)

(1) Acetic acid + ATP + CoA → acetyl-CoA + AMP + pyrophosphate

(citrate synthase)

(2) Acetyl-CoA + oxaloacetate + H_2O → citrate + CoA

(L-malate dehydrogenase)

(3) L-Malate + NAD^+ ↔ oxaloacetate + NADH + H^+

Kit size:	141.6 mL of prepared reagent (R1 + R2)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 15 min
Detection limit:	10 mg/L (recommended assay format)
Application examples:	Wine, beer, fruit and fruit juices, soft drinks, vinegar, vegetables, pickles, dairy products (e.g. cheese), meat, fish, bread, bakery products (and baking agents), ketchup, soy sauce, mayonnaise, dressings, paper (and cardboard), tea, pharmaceuticals (e.g. infusion solutions), feed and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by EN, ISO, ICUMSA, IFU, MEBAK

Advantages

- No wasted ACS solution (stable suspension supplied)
- PVP incorporated to prevent tannin inhibition
- Very stable reagent when prepared for auto-analyser applications (> 3 days at 4°C)
- Linear calibration up to 30 µg/mL of acetic acid in final reaction solution
- Validated by the University of Wine, Suze la Rousse, France
- Very competitive price (cost per mL of reagent)
- All reagents stable for > 2 years after preparation

Megazyme

Acetic Acid (Acetyl-CoA synthetase manual format) — Cat. No. K-ACET

Manual format UV-method for the determination of Acetic Acid in foodstuffs, beverages and other materials

Principle:

(acetyl-CoA synthetase)
(1) Acetic acid + ATP + CoA → acetyl-CoA + AMP + pyrophosphate

(citrate synthase)
(2) Acetyl-CoA + oxaloacetate + H_2O → citrate + CoA

(L-malate dehydrogenase)
(3) L-Malate + NAD^+ ⇔ oxaloacetate + NADH + H^+

Kit size:	53 assays
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 14 min
Detection limit:	0.14 mg/L
Application examples:	Wine, beer, fruit and fruit juices, soft drinks, vinegar, vegetables, pickles, dairy products (e.g. cheese), meat, fish, bread, bakery products (and baking agents), ketchup, soy sauce, mayonnaise, dressings, paper (and cardboard), tea, pharmaceuticals (e.g. infusion solutions), feed, and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by EN, ISO, ICUMSA, IFU, MEBAK

Advantages

- No wasted ACS solution (stable suspension supplied)
- PVP incorporated to prevent tannin inhibition
- All reagents stable for > 2 years after preparation
- Very competitive price (cost per test)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing

Acetic Acid (Acetate kinase analyser format) — Cat. No. K-ACETAK

Analyser format UV-method for the determination of Acetic Acid in foodstuffs, beverages and other materials

Principle:

(acetate kinase)
(1) Acetic acid + ATP → acetyl-phosphate + ADP

(pyruvate kinase)
(2) ADP + PEP → ATP + pyruvate

(D-lactate dehydrogenase)
(3) Pyruvate + NADH + H^+ → D-lactic acid + NAD^+

Kit size:	550 assays
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 10 min
Detection limit:	10 mg/L (recommended assay format)
Application examples:	Wine, beer, fruit and fruit juices, soft drinks, vinegar, vegetables, pickles, dairy products (e.g. cheese), meat, fish, bread, bakery products (and baking agents), ketchup, soy sauce, mayonnaise, dressings, paper (and cardboard), tea, pharmaceuticals (e.g. infusion solutions), feed, and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Improved method***

Advantages

- Very stable reagent when prepared for auto-analyser applications (> 7 days at 4°C)
- PVP incorporated to prevent tannin inhibition
- Linear calibration (R^2 ~ 0.9995) up to 30 µg/mL of acetic acid in final reaction solution
- Validated by the University of Wine, Suze la Rousse, France
- Very rapid reaction
- Very competitive price (cost per mL of reagent)
- All reagents stable for > 2 years
- Extended cofactors stability

Acetic Acid (Analyser format) — Cat. No. K-ACETGK

Analyser format UV-method for the determination of Acetic Acid in foodstuffs, beverages and other materials

Principle:

(acetate kinase)
(1) Acetic acid + ATP → acetyl-phosphate + ADP

(PTA)
(2) Acetyl-phosphate + CoA → acetyl-CoA + P_i

(ADP-GK)
(3) ADP + D-glucose → glucose 6-phosphate + AMP

(G6P-DH)
(4) Glucose-6-phosphate + NAD^+ → 6-phosphogluconate + NADH

Kit size:	500 assays
Method:	Spectrophotometric at 340 nm
Reaction time:	8 min at 25°C or 5 min at 37°C
Detection limit:	1.8 g/L (recommended assay format)
Application examples:	Wine, beer, fruit and fruit juices, soft drinks, vinegar, vegetables, pickles, dairy products (e.g. cheese), meat, fish, bread, bakery products (and baking agents), ketchup, soy sauce, mayonnaise, dressings, paper (and cardboard), tea, pharmaceuticals (e.g. infusion solutions), feed, and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Improved method***

Advantages

- Excellent reagent stability
- > 7 days at 4°C or > 2 years at -20°C when prepared for auto-analyser applications
- > 2 years as supplied
- Very rapid reaction (~ 5 min at 37°C)
- Linear calibration (R2 ~ 0.997 up to 1.8 g/L sample)

Acetic Acid (Rapid manual format) — Cat. No. K-ACETRM

Manual format UV-method for the determination of Acetic Acid in foodstuffs, beverages and other materials

Principle:

(acetate kinase)
(1) Acetic acid + ATP → acetyl-phosphate + ADP

(phosphotransacetylase)
(2) Acetyl-phosphate + CoA → acetyl-CoA + P_i

(pyruvate kinase)
(3) ADP + PEP → ATP + pyruvate

(D-lactate dehydrogenase)
(4) Pyruvate + NADH + H^+ → D-lactic acid + NAD^+

Kit size:	72 assays (manual) / 720 (microplate)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 4 min
Detection limit:	0.063 mg/L
Application examples:	Wine, beer, fruit and fruit juices, soft drinks, vinegar, vegetables, pickles, dairy products (e.g. cheese), meat, fish, bread, bakery products (and baking agents), ketchup, soy sauce, mayonnaise, dressings, paper (and cardboard), tea, pharmaceuticals (e.g. infusion solutions), feed and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Improved method***

Advantages

- Improved assay format (only two absorbance readings required)
- All reagents stable for > 2 years after preparation
- PVP incorporated to prevent tannin inhibition
- Very rapid reaction (~ 4 min)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Very competitive price (cost per test)
- Suitable for Manual and Microplate formats

Ammonia (Rapid) — Cat. No. K-AMIAR

UV-method for the determination of Ammonia in foodstuffs, beverages and other materials

Principle:

(microbial glutamate dehydrogenase)

(1) 2-Oxoglutarate + NADPH + NH_4^+ → L-glutamic acid + $NADP^+$ + H_2O

Kit size:	96 assays (manual) / 960 (microplate) / 960 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 3 min
Detection limit:	0.07 mg/L
Application examples:	Grape juice, wine, fruit juices, soft drinks, dairy products (e.g. milk), dietetic food, soy sauce, eggs and egg products, cheese, meat, processed meat, seafood, bakery products (and baking agents), fertilisers, pharmaceuticals, tobacco, cosmetics, water, Kjeldahl analysis, paper (and cardboard), water and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by MEBAK

Advantages

- Very rapid reaction due to use of uninhibited glutamate dehydrogenase
- Enzyme supplied as stabilised suspension
- Very competitive price (cost per test)
- All reagents stable for > 2 years as supplied
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

α-Amylase ("Ceralpha" Method) — Cat. No. K-CERA

Colourimetric method for the determination of Alpha-Amylase in foodstuffs, feed and fermentation products

Principle:

(α-amylase)

(1) Benzylidene-G_7-α-PNP + H_2O → Benzylidene-G_x + $G_{(7-x)}$-α-PNP

(thermostable α-glucosidase)

(2) $G_{(7-x)}$-α-PNP + H_2O → D-glucose + PNP

(alkaline solution)

(3) PNP → phenolate ion (yellow colour)

Note: PNP = 4-nitrophenol

Kit size:	100 / 200 assays
Method:	Spectrophotometric at 400 nm
Total assay time:	~ 20 min
Detection limit:	0.05 U/mL
Application examples:	Cereal flours, fermentation broths and other materials
Method recognition:	AOAC (Method 2002.01), AACC (Method 22.02.01), ICC (Standard No. 303), RACI (Standard Method), and CCFRA (Flour Testing Working Group Method 0018)

Advantages

- Very cost effective
- All reagents stable for > 2 years after preparation
- Very specific
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

α-Amylase ("Sprout Damaged" Method) — Cat. No. K-AMYLSD

Highly sensitive colourimetric method for the determination of α-Amylase in sprout damaged grain

Principle:

(α-amylase)

(1) Ethylidene-G_7-α-PNP + H_2O → Ethylidene-G_x + $G_{(7-x)}$-α-PNP

(thermostable α-glucosidase)

(2) $G_{(7-x)}$-α-PNP + H_2O → D-glucose + PNP

(alkaline solution)

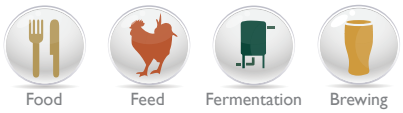
(3) PNP → phenolate ion (yellow colour)

Note: PNP = 4-nitrophenol

Kit size:	80 / 160 assays (manual) / 640 (auto-analyser)
Method:	Spectrophotometric at 400 nm
Total assay time:	~ 5 min
Detection limit:	0.05 U/mL
Application examples:	Sprout damaged wheat grain
Method recognition:	Novel method

Advantages

- Extremely high sensitivity - 2.4-fold increase over Ceralpha (K-CERA)
- Very cost effective
- All reagents stable for > 2 years after preparation
- Very specific
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual and auto-analyser formats



β-Amylase ("Betamyl-3" Method) — Cat. No. K-BETA3

Colourimetric method for the determination of β-Amylase in cereal grains, malt, food, beverages and fermentation products

Principle:

(β-amylase)

(1) G_3-β-PNP + H_2O → G_2 + G-β-PNP

(β-glucosidase)

(2) G-β-PNP + H_2O → D-glucose + PNP

(alkaline solution)

(3) *p*-Nitrophenol → phenolate ion (yellow colour)

Note: PNP = 4-nitrophenol

Kit size:	100 / 200 assays
Method:	Spectrophotometric at 400 nm
Reaction time:	~ 10 min
Detection limit:	0.05 U/mL of sample solution
Application examples:	Cereal flours, malts and other materials
Method recognition:	Modification of RACI (Standard Method)

Advantages

- Very cost effective
- All reagents stable for > 2 years as supplied
- Only enzymatic kit available
- Very specific
- Simple format
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Food Feed

Amylose / Amylopectin

Cat. No. K-AMYL

Colourimetric method for the determination of Amylose and Amylopectin in cereals, food and feed

Principle:

(Con A)

(1) Soluble starch (amylose + amylopectin) → amylose + amylopectin-Con A
(soluble) (precipitate)

(α-amylase + amyloglucosidase)

(2) Amylose (in solution) + H_2O → D-glucose

(glucose oxidase)

(3) D-Glucose + H_2O + O_2 → D-gluconate + H_2O_2

(peroxidase)

(4) H_2O_2 + *p*-hydroxybenzoic acid + 4-aminoantipyrine → quinoneimine + H_2O

(α-amylase + amyloglucosidase)

(5) Total starch (in solution) + H_2O → D-glucose

Kit size:	100 assays
Method:	Spectrophotometric at 510 nm
Total assay time:	~ 120 min
Detection limit:	Amylose 5-95% of total starch content
Application examples:	Cereal starches, flours, pure starches and foods
Method recognition:	***Novel method***

Advantages

- Very cost effective (cost per test)
- All reagents stable for > 12 months after preparation
- Only enzymatic kit available
- Accurate and reliable amylose / amylopectin ratio determination
- Simple format
- Standard included

Food Feed

Amyloglucosidase / Glucoamylase

Cat. No. K-AMG

Colourimetric method for the determination of Amyloglucosidase

Principle:

(amyloglucosidase)

(1) G_2-β-PNP + H_2O → D-glucose + G-β-PNP

(thermostable β-glucosidase)

(2) G-β-PNP + H_2O → D-glucose + PNP

(alkaline solution)

(3) PNP → phenolate ion (yellow colour)

Note: PNP = 4-nitrophenol

Kit size:	150 / 300 assays
Method:	Spectrophotometric at 400 nm
Total assay time:	~ 10 min
Detection limit:	0.05 U/mL
Application examples:	Industrial enzyme preparations
Method recognition:	***Novel method***

Advantages

- Highly sensitive
- Very cost effective
- All reagents stable for > 2 years after preparation
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Arabinan — Cat. No. K-ARAB

UV-method for the determination of Arabinan in plant materials and juices

Principle:

(*endo*-arabinanase + α-L-arabinofuranosidase)
(1) Arabinan + H_2O → L-arabinose

(galactose mutarotase)
(2) α-L-Arabinose ↔ β-L-arabinose

(β-galactose dehydrogenase)
(3) β-L-Arabinose + NAD^+ → L-arabinonic acid + NADH + H^+

Kit size:	100 assays
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 10 min
Detection limit:	1.3 mg/L
Application examples:	Fruit juices and other materials
Method recognition:	***Novel method***

Advantages

- Very rapid reaction due to inclusion of galactose mutarotase (patented technology)
- Very cost effective
- All reagents stable for > 2 years after preparation
- Only enzymatic kit available
- Very specific
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

L-Arabinose / D-Galactose (Rapid) — Cat. No. K-ARGA

UV-method for the determination of L-Arabinose and D-Galactose in hydrolysed plant products

Principle:

(galactose mutarotase)
(1) α-L-Arabinose / α-D-galactose ↔ β-L-arabinose / β-D-galactose

(β-galactose dehydrogenase)
(2) β-L-Arabinose + NAD^+ → L-arabinonic acid + NADH + H^+

(β-galactose dehydrogenase)
(3) β-D-Galactose + NAD^+ → D-galactonic acid + NADH + H^+

Kit size:	115 assays (manual) / 1150 (microplate) / 1150 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 5 min
Detection limit:	1.3 mg/L
Application examples:	Analysis of hydrolysates of oligo- and polysaccharides (e.g. arabinan, arabinoxylan, galactan, arabinogalactan), milk, dairy products, foods containing milk (e.g. dietetic foods, bakery products, baby food, chocolate, sweets and ice-cream), food additives (e.g. sweeteners), cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Novel method***

Advantages

- Very rapid reaction due to inclusion of galactose mutarotase (patented technology)
- Very cost effective
- All reagents stable for > 2 years after preparation
- Only enzymatic kit available
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

L-Arginine / Urea / Ammonia (Rapid) — Cat. No. K-LARGE

UV-method for the determination of L-Arginine, Urea and Ammonia in grape juice, must and wine

Principle:

(microbial glutamate dehydrogenase)

(1) 2-Oxoglutarate + NADPH + NH_4^+ → L-glutamic acid + $NADP^+$ + H_2O

(urease)

(2) Urea + H_2O → 2 NH_3 + CO_2

(arginase)

(3) L-Arginine + H_2O → urea + ornithine

Kit size:	50 assays of each
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 20 min [ammonia (2 min), urea (6 min), L-arginine (7 min)]
Detection limit:	0.07 mg/L (ammonia), 0.13 mg/L (urea), 0.37 mg/L (L-arginine)
Application examples:	Grape juice, wine must, wine and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Improved method***

Advantages

- Improved assay format
- Very rapid reactions due to use of uninhibited glutamate dehydrogenase
- All enzymes supplied as stabilised suspensions
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability

L-Ascorbic Acid — Cat. No. K-ASCO

Colourimetric method for the determination of L-Ascorbic Acid in foodstuffs, feed, wine and other materials

Principle:

(5-methylphenazinium methosulphate)

(1) L-Ascorbic acid + R-H_2 + MTT → dehydroascorbate + MTT-formazan + H^+

(ascorbic acid oxidase)

(2) L-Ascorbic acid + ½O_2 → dehydroascorbate + H_2O

Kit size:	40 assays (manual) / 400 (microplate) / 400 (auto-analyser)
Method:	Spectrophotometric at 578 nm
Reaction time:	~ 8 min
Detection limit:	0.175 mg/L
Application examples:	Wine, beer, fruit juices, soft drinks, jam, milk, dairy products (e.g. cheese), dietetic foods, baby foods, processed meat, baking additives, fruit and vegetables (e.g. tomato and potato), pharmaceuticals, feed and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by MEBAK

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 6 months after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

L-Asparagine / L-Glutamine / Ammonia (Rapid) — Cat. No. K-ASNAM

UV-method for the determination of L-Asparagine, L-Glutamine and Ammonia in potatoes, foodstuffs and cell culture media

Principle:

(glutaminase)
(1) L-Glutamine + H_2O → L-glutamate + NH_4^+

(microbial glutamate dehydrogenase)
(2) NH_4^+ + 2-Oxoglutarate + NADPH → L-glutamate + $NADP^+$ + H_2O

(asparaginase)
(3) L-Asparagine + H_2O → L-aspartate + NH_4^+

Kit size:	50 assays of each
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 20 min
Detection limit:	0.50 mg/L (L-asparagine) 0.54 mg/L (L-glutamine) 0.06 mg/L (ammonia)
Application examples:	Potatoes, potato products, vegetables, cereals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Novel method***

Advantages

- Very rapid reaction due to use of uninhibited glutamate dehydrogenase
- All enzymes supplied as stabilised suspensions
- Only kit available
- Very cost effective
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Aspartame — Cat. No. K-ASPTM

UV-method for the determination of Aspartame (and breakdown products) in foodstuffs, beverages and other materials

Principle:

(pH 12.5)
(1) Asp-Phe-O-Me → Asp-Phe + MeOH

(dipeptidase M)
(2) Asp-Phe + H_2O → L-aspartate + L-phenylalanine

(glutamate-oxaloacetate transaminase)
(3) L-Aspartate + 2-oxoglutarate → L-glutamate + oxaloacetate

(L-malate dehydrogenase)
(4) Oxaloacetate + NADH + H^+ → L-malate + NAD^+

Kit size:	50 assays (manual) / 500 (microplate) / 500 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 5 min
Detection limit:	0.57 mg/L
Application examples:	Soft drinks, artificial sweeteners, candies, mints, chewing gum, dietetic products, jam, chocolate and other materials
Method recognition:	***Novel method***

Advantages

- Very cost effective
- All reagents stable for > 12 months after preparation
- Only enzymatic kit available
- Measures aspartame and breakdown products (L-aspartate and aspartame acid)
- Very specific
- Very rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

Food Feed

Available Carbohydrates / Dietary Fiber — Cat. No. K-ACHDF

An integrated procedure for the measurement of Available Carbohydrates and Dietary Fiber in cereal products, fruit and vegetables and food products

Principle (*Dietary Fiber*):

(α-amylase + amyloglucosidase)
(1) Starch + H_2O → glucose

(protease)
(2) Protein + H_2O → peptides

(3) Dietary fiber determined gravimetrically following alcohol precipitation

Principle (*Available Carbohydrates*):

(sucrase / maltase + ß-galactosidase)
(4) Sucrose, maltose and lactose → D-glucose + D-fructose + D-galactose

(PGI, hexokinase and glucose-6-phosphate dehydrogenase)
(5) D-Glucose + D-fructose + ATP + $NADP^+$ → gluconate-6-phosphate + + NADPH + ADP + H^+

Kit size: 100 assays of each
Application examples: Food ingredients, food products and other materials
Method recognition: Dietary Fibre - AOAC (Methods 985.29, 991.42, 991.43 and 993.19) and AACC (Methods 32-05.01, 32-07.01 and 32-21.01)

Advantages

- Very cost effective
- All reagents stable for > 2 years after preparation
- High purity / standardised enzymes employed
- Only kit available
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Simple format

Biofuels

endo-1,4-β-Glucanase (cellulase) — Cat. No. K-CELLG3

Colourimetric method for the determination of *endo*-1,4-β-glucanase (cellulase) in enzyme preparations and fermentation products

Principle:

(*endo*-1,4-β-glucanase)
(1) Benzylidene-G_3-β-CNP + H_2O → Blocked-G_x + $G_{(3-x)}$-β-CNP

(thermostable β-glucosidase)
(2) $G_{(3-x)}$-β-CNP + H_2O → D-glucose + CNP

(alkaline solution)
(3) CNP → phenolate ion (yellow colour)

Note: CNP = 2-Chloro-4-nitrophenol

Kit size: 180 / 360 assays
Method: Spectrophotometric at 400 nm
Total assay time: ~ 20 min
Detection limit: 0.05 U/mL
Application examples: Fermentation broths, industrial enzyme preparations, biofuels research
Method recognition: ***Novel method***

Note: The analogous fluorimetric reagent (R-CELLF) is also available with 10-fold greater sensitivity.

Advantages

- Cost effective
- All reagents stable for > 2 years after preparation
- Completely specific for cellulase (*endo*-1,4-glucanase). The substrate is not hydrolysed by β-glucosidase, cellobiohyrolase or any other enzymes tested
- Kinetic assays possible due to significant phenolate ion presence (and UV absorbance) at pH 5-6
- Simple format. Well suited to automation
- Standard included

Citric Acid

Cat. No. K-CITR

UV-method for the determination of Citric Acid in foods, beverages and other materials

Principle:

(citrate lyase)

(1) Citrate → oxaloacetate + acetate

(L-malate dehydrogenase)

(2) Oxaloacetate + NADH + H^+ → L-malate + NAD^+

(D-lactate dehydrogenase)

(3) Pyruvate + NADH + H^+ → D-lactate + NAD^+

Kit size:	72 assays (manual) / 720 (microplate) / 840 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 5 min
Detection limit:	0.921 mg/L
Application examples:	Grape juice, wine, beer, fruit juices, soft drinks, tea, dairy products (e.g. cheese), meat, processed meat, vegetable and fruit products, bakery products, paper, pharmaceuticals, cosmetics and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by MEBAK, OIV, EU, ISO2963, AOAC and IFU22

(**Note**: If the enzyme oxaloacetate decarboxylase is present in the sample, some of the oxaloacetate product is converted to pyruvate. Therefore, to ensure citric acid is measured quantitatively, D-lactate dehydrogenase (D-LDH) is employed to efficiently convert any pyruvate produced into D-lactate and NAD^+).

Advantages

- Reconstituted citrate lyase stable for 4 weeks at 4°C / 6 months at -20°C
- Buffer / cofactor / enzyme tablets for efficient use of kit components
- PVP incorporated to prevent tannin inhibition
- Very competitive price (cost per test)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

Ethanol

Cat. No. K-ETOH

UV-method for the determination of Ethanol in foodstuffs, beverages, and other materials

Principle:

(alcohol dehydrogenase)

(1) Ethanol + NAD^+ ↔ acetaldehyde + NADH + H^+

(aldehyde dehydrogenase)

(2) Acetaldehyde + NAD^+ + H_2O → acetic acid + NADH + H^+

Kit size:	60 assays (manual) / 600 (microplate) / 600 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 5 min
Detection limit:	0.093 mg/L
Application examples:	Wine, beer, cider, alcoholic fruit juices, spirits, liqueurs, low-alcoholic / non-alcoholic beverages, pickles, fruit and fruit juice, chocolate products, vinegar, jam, bread and bakery products, honey, soy sauce, dairy products, cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by IFU, EBC, MEBAK, ASBC

Advantages

- Simple format – aldehyde dehydrogenase supplied as stable suspension
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

Total Dietary Fiber

Cat. No. K-TDFR

For the determination of Total Dietary Fiber in cereal products, foodstuffs, feeds and other materials

Principle:

(α-amylase + amyloglucosidase)

(1) Starch + H_2O → D-glucose

(protease)

(2) Protein + H_2O → peptides

(3) Dietary fiber determined gravimetrically following alcohol precipitation

(4) Ash and residual protein determined on DF residues and subtracted

Kit size:	200 assays
Method:	Hydrolysis / removal of non-dietary fibre components
Total assay time:	~ 100 min
Detection limit:	0.5-100% of sample weight
Application examples:	Food ingredients, food products and other materials
Method recognition:	AOAC (Methods 985.29, 991.42, 991.43 and 993.19), AACC (Methods 32-05.01, 32-06.01, 32-07.01 and 32-21.01) and CODEX (Type I Method)

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years
- High purity / standardised enzymes employed
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Simple format

Total Dietary Fiber (Integrated)

Cat. No. K-INTDF

For the determination of Total Dietary Fiber in cereal products, foodstuffs, feeds and other materials. CODEX Type I method (2011)

Principle:

(Pancreatic α-amylase + amyloglucosidase)

(1) Non-resistant starch + H_2O → D-glucose

(protease)

(2) Protein + H_2O → peptides

(3) IDF (including resistant starch) and alcohol precipitated soluble DF (SDFP) determined gravimetrically

(4) Alcohol soluble DF (SDFS) determined by HPLC

(5) Ash and residual protein determined on DF residues and subtracted

Kit size:	100 assays
Method:	Hydrolysis / removal of non-dietary fibre components
Total assay time:	~ 3 hr work (over 2 days)
Detection limit:	0.5-100% of sample weight
Application examples:	Food ingredients, food products and other materials
Method recognition:	AOAC (Methods 2009.01; 2011.25) AACC (Method 32-45.01; 32-50.01) CODEX (Type I method)

Advantages

- The only method that is consistent with the CODEX Alimentarius definition of dietary fibre
- High purity / standardised enzymes employed
- All reagents stable for > 2 years
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Very competitive price (cost per test)

Formic Acid — Cat. No. K-FORM

UV-method for the determination of Formic Acid in foods, beverages and other materials

Principle:

(formate dehydrogenase)

(1) Formic acid + NAD^+ → CO_2 + NADH + H^+

Kit size:	25 assays (manual) / 250 (microplate) /250 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 12 min
Detection limit:	0.0932 mg/L
Application examples:	Wine, fruit juices, pickles, vinegar, jam, bakery products, honey, fish, meat and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by MEBAK

Advantages

- No wasted formate dehydrogenase solution (stable suspension supplied)
- Pyrazole incorporated to prevent alcohol dehydrogenase interference
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

Fructan (Hexokinase format) — Cat. No. K-FRUCHK

UV-method for the determination of Fructan in foodstuffs, beverages and other materials

Principle:

(sucrase + maltase)

(1) Sucrose + maltosaccharides + H_2O → D-glucose + D-fructose

(*exo*-inulinase + *endo*-inulinase)

(2) Fructan + H_2O → D-glucose + D-fructose

(hexokinase)

(3) D-Glucose + D-fructose + ATP → G-6-P + F-6-P + ADP

(glucose-6-phosphate dehydrogenase)

(4) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

(phosphoglucose isomerase)

(5) F-6-P ↔ G-6-P

Kit size:	50 assays
Method:	Spectrophotometric at 340 nm
Total assay time:	~ 90 min
Detection limit:	1-100% of sample weight
Application examples:	Flours, plant materials (e.g. onion), food products and other materials
Method recognition:	This method is a modification of AOAC Method 999.03 and AACC Method 32-32.01

Advantages

- Very cost effective
- All reagents stable for > 12 months after preparation
- Fructan kits are available only from Megazyme
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included

Fructan (PAHBAH format) — Cat. No. K-FRUC

Colourimetric method for the determination of Fructan in plant products, foodstuffs and other materials

Principle:

(sucrase)
(1) Sucrose + H_2O → D-glucose + D-fructose

(β-amylase + maltase + pullulanase)
(2) Starch + maltosaccharides + H_2O → D-glucose

(borohydride)
(3) D-Glucose + D-fructose → D-sorbitol + D-mannitol (non-reducing)

(*exo*-inulinase + *endo*-inulinase)
(4) Fructan + H_2O → D-glucose + D-fructose

(100°C, 6 min)
(5) D-Glucose + D-fructose + PAHBAH → PAHBAH colour complex

Kit size:	100 assays
Method:	Spectrophotometric at 410 nm
Total assay time:	~ 90 min
Detection limit:	1-100% of sample weight
Application examples:	Flours, plant materials (e.g. onion), food products and other materials
Method recognition:	AOAC (Method 999.03), AACC (Method 32-32) and CODEX (Type III Method)

Advantages

- Very cost effective
- All kit reagents stable for > 2 years after preparation
- Unaffected by high sucrose / reducing sugar concentrations
- Fructan kits are only available from Megazyme
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included

D-Fructose / D-Glucose — Cat. No. K-FRUGL

UV-method for the determination of D-Fructose and D-Glucose in foodstuffs, beverages and other materials

Principle:

(hexokinase)
(1) D-Glucose + ATP → G-6-P + ADP

(hexokinase)
(2) D-Fructose + ATP → F-6-P + ADP

(glucose-6-phosphate dehydrogenase)
(3) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

(phosphoglucose isomerase)
(4) F-6-P ⇔ G-6-P

Kit size:	110 assays (manual) / 1100 (microplate) / 1100 (auto-analyser
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 13 min
Detection limit:	0.66 mg/L
Application examples:	Wine, beer, fruit juices, soft drinks, milk, jam, honey, dietetic foods, bread, bakery products, candies, desserts, confectionery, ice-cream, fruit and vegetables, condiments, tobacco, cosmetics, pharmaceuticals, paper and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by AOAC, EN, NEN, NF, DIN, GOST, OIV, IFU, AIJN, MEBAK, IOCCC

Advantages

- PVP incorporated to prevent tannin inhibition
- Validated by the University of Wine, Suze la Rousse, France
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation (manual analysis applications)
- Rapid reaction at either 25 or 37°C
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

D-Fructose / D-Glucose Liquid Ready Reagents

Cat. No. **K-FRGLQR**

UV-method suitable for auto-analyser and microplate formats for the determination of D-Fructose and D-Glucose in foodstuffs, beverages and other materials

Principle:

(hexokinase)
(1) D-Glucose + ATP → G-6-P + ADP

(hexokinase)
(2) D-Fructose + ATP → F-6-P + ADP

(glucose-6-phosphate dehydrogenase)
(3) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

(phosphoglucose isomerase)
(4) F-6-P ⇔ G-6-P

Kit size:	1100 assays (microplate) / 1100 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 13 min
Detection limit:	133 mg/L (recommended format)
Application examples:	Wine, beer, fruit juices, soft drinks, milk, jam, honey, dietetic foods, bread, bakery products, candies, desserts, confectionery, ice-cream, fruit and vegetables, condiments, tobacco, cosmetics, pharmaceuticals, paper and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by AOAC, EN, NEN, NF, DIN, GOST, OIV, IFU, AIJN, MEBAK, IOCCC

Advantages

- PVP incorporated to prevent tannin inhibition
- "Ready to use" liquid stable formulation
- Very competitive price (cost per test)
- All reagents stable for > 2 years
- Very rapid reaction (~ 13 min)
- Standard included
- Suitable for microplate and auto-analyser formats

D-Fructose / D-Glucose (*MegaQuant™* format)

Cat. No. **K-FRGLMQ**

Simple colourimetric method for the determination of D-Fructose and D-Glucose in foodstuffs, beverages and other materials

Principle:

(hexokinase)
(1) D-Glucose + ATP → G-6-P + ADP

(hexokinase)
(2) D-Fructose + ATP → F-6-P + ADP

(phosphoglucose isomerase)
(3) F-6-P ⇔ G-6-P

(glucose-6-phosphate dehydrogenase)
(4) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

(diaphorase)
(5) INT + NADPH + H^+ → $NADP^+$ + INT-formazan

Kit size:	60 assays
Method:	Spectrophotometric at 505 nm
Reaction time:	~ 10 min
Detection limit:	15.4 mg/L
Application examples:	Grape juice / must, wine, beer, fruit juices, soft drinks, milk, jam, honey, dietetic foods, bread, bakery products, candies, desserts, confectionery, ice-cream, fruit and vegetables, condiments, tobacco, cosmetics, pharmaceuticals, paper and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Novel method***

Advantages

- Novel product, patented technology
- Spectrophotometer / laboratory expertise not required
- Highly stable reagents (at least three seasons use)
- Very competitive price (cost per test)
- Very simple procedure
- Rapid reaction time (~ 10 min)
- Standard included

L-Fucose

Cat. No. K-FUCOSE

UV-method for the determination of L-Fucose in plant material, polysaccharides, pharmaceuticals and other materials

Principle:

(L-fucose dehydrogenase)

(1) L-Fucose + $NADP^+$ → L-fucono-1,5-lactone + $NADPH + H^+$

Kit size:	100 assays (manual) / 1000 (microplate) / 1020 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 10 min
Detection limit:	15.4 mg/L
Application examples:	L-Fucose is present as the main component in fucoidan (a marine polysaccharide), foods, pharmaceuticals and other materials (e.g. biological samples, etc.)
Method recognition:	***Novel method***

Advantages

- Very cost effective
- All reagents stable for > 2 years after preparation
- Only enzymatic kit available
- Simple format
- Rapid reaction time (~ 10 min)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

Galactomannan

Cat. No. K-GALM

UV-method for the determination of Galactomannan in legume seeds, foodstuffs and plant products

Principle:

(β-mannanase)

(1) Galactomannan + H_2O → galactomanno-oligomers

(β-mannanase + α-galactosidase)

(2) Galactomanno-oligomers + H_2O → D-galactose + manno-oligomers

(β-galactose dehydrogenase)

(3) D-Galactose + NAD^+ → D-galactonic acid + $NADH + H^+$

Kit size:	100 assays
Method:	Spectrophotometric at 340 nm
Total assay time:	~ 80 min
Detection limit:	1-100% of sample weight
Application examples:	Seeds, milling fractions and food ingredients
Method recognition:	***Novel method***

Advantages

- Galactose dehydrogenase now included in the kit
- Very cost effective
- All reagents stable for > 2 years after preparation
- Only enzymatic kit available
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Food Feed Brewing

β-Glucan (Mixed linkage) — Cat. No. K-BGLU

Colourimetric method for the determination of β-Glucan in cereal grains, feed, foodstuffs, beverages and other materials

Principle:

(lichenase)
(1) β-Glucan + H_2O → β-gluco-oligosaccharides

(β-glucosidase)
(2) β-Gluco-oligosaccharides + H_2O → D-glucose

(glucose oxidase)
(3) D-Glucose + H_2O + O_2 → D-gluconate + H_2O_2

(peroxidase)
(4) $2H_2O_2$ + *p*-hydroxybenzoic acid + 4-aminoantipyrine → quinoneimine + $4H_2O$

Kit size:	100 assays
Method:	Spectrophotometric at 510 nm
Total assay time:	~ 100 min
Detection limit:	0.5-100% of sample weight
Application examples:	Oats, barley, malt, wort, beer, food and other materials
Method recognition:	AOAC (Method 995.16), AACC (Method 32-23.01), EBC (Methods 3.11.1, 4.16.1 and 8.11.1), ICC (Standard No. 166), RACI (Standard Method) and CODEX (Type II Method)

Advantages

- Very cost effective
- All reagents stable for > 2 years as supplied
- Only enzymatic kit available
- Very specific
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included

Food Feed

β-Glucan (Yeast and mushroom) — Cat. No. K-YBGL

Colourimetric method for the determination of Yeast and Mushroom β-Glucan in yeast, mushroom, foodstuffs and other materials

Principle:

(conc. HCl, 30°C, 45 min)
(1) 1,3:1,6-β-Glucan + 1,3-β-glucan + α-glucan + H_2O → soluble glucan

(1.3 M HCl, 100°C, 2 h)
(2) Soluble glucan + H_2O → D-glucose + laminarisaccharides (trace)

(*exo*-1,3-β-glucanase + β-glucosidase)
(3) Laminarisaccharides + H_2O → D-glucose

(glucose oxidase)
(4) D-Glucose + H_2O + O_2 → D-gluconate + H_2O_2

(peroxidase)
(5) $2H_2O_2$ + *p*-hydroxybenzoic acid + 4-aminoantipyrine → quinoneimine + $4H_2O$

(amyloglucosidase)
(6) α-Glucan + H_2O → D-glucose

Kit size:	100 assays
Method:	Spectrophotometric at 510 nm
Total assay time:	~ 100 min
Detection limit:	1-100% of sample weight
Application examples:	Yeast preparations, mushroom preparations and other materials
Method recognition:	***Novel method***

Advantages

- Very cost effective
- All reagents stable for > 12 months after preparation
- Only enzymatic kit available
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included

β-Glucan (Yeast-Enzymatic) — Cat. No. K-EBHLG

Colourimetric method for the enzymatic determination of yeast β-Glucan and also (1-3)-β Glucans.

Principle:

(1) 1,3:1,6-β-Glucan + 1,3-β-glucan + H_2O —(KOH, 4°C, 30 min)→ **soluble glucan**

(2) Soluble glucan + H_2O —(*Glucazyme*, 40°C, 16 h)→ **D-glucose**

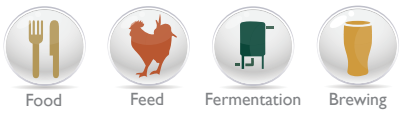
(3) D-Glucose + H_2O + O_2 —(glucose oxidase)→ **D-gluconate + H_2O_2**

(4) $2H_2O_2$ + *p*-hydroxybenzoic acid + 4-aminoantipyrine —(peroxidase)→ **quinoneimine + $4H_2O$**

Kit size:	50 assays
Method:	Spectrophotometric at 510 nm
Reaction time:	~ 100 min
Detection limit:	1-100% of sample weight
Application examples:	Yeast preparations and other materials
Method recognition:	***Novel method***

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 12 months after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included



β-Glucanase (Malt and microbial) — Cat. No. K-MBGL

Colourimetric method for the determination of β-Glucanase in malt, foodstuffs and fermentation products

Principle:

(1) Azo-Barley β-glucan (polymer) —(β-glucanase)→ **Azo-barley β-glucan (fragments)**

(2) Add alcohol; centrifuge to remove polymeric Azo-barley β-glucan

(3) Measure the absorbance of the supernatant solution

Kit size:	100 assays
Method:	Spectrophotometric at 590 nm
Total assay time:	~ 30 min
Detection limit:	100 U/kg of malt
Application examples:	Malt extracts, wort, beer and other materials
Method recognition:	RACI (Standard Method)

Advantages

- Very cost effective
- All reagents stable for > 2 years during use
- Only kit available
- Very specific
- Simple format
- Standard included

Glucomannan — Cat. No. K-GLUM

UV-method for the determination of Glucomannan in plant products, foodstuffs and other materials

Principle:

(β-mannanase)
(1) Ac-Glucomannan + H_2O → Ac-glucomanno-oligomers

(pH 12.5)
(2) Ac-Glucomanno-oligomers + H_2O → glucomanno-oligomers + acetate

(β-glucosidase + β-mannosidase)
(3) Glucomanno-oligomers + H_2O → D-glucose + D-mannose

(hexokinase)
(4) D-glucose + D-mannose + ATP → G-6-P + M-6-P + ADP

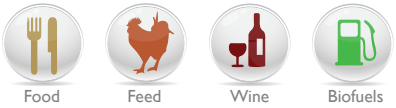
(glucose-6-phosphate dehydrogenase)
(5) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

(phosphomannose isomerase) (phosphoglucose isomerase)
(6) M-6-P ↔ F-6-P ↔ G-6-P

Kit size:	50 assays
Method:	Spectrophotometric at 340 nm
Total assay time:	120 min
Detection limit:	1-100% of sample weight
Application examples:	Jelly sweets, cosmetics, food gums and other materials
Method recognition:	***Novel method***

Advantages

- Very cost effective
- Only enzymatic kit available
- Simple format
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included



D-Gluconic Acid / D-Glucono-δ-lactone — Cat. No. K-GATE

UV-method for the determination of D-Gluconic Acid and D-Glucono-δ-lactone in foodstuffs, beverages and other materials

Principle:

(gluconate kinase)
(1) D-Gluconate + ATP → gluconate-6-phosphate + ADP

(gluconate-6-phosphate dehydrogenase)
(2) Gluconate-6-phosphate + $NADP^+$ → ribulose-5-phosphate + NADPH + CO_2 + H^+

(pH 11)
(3) D-Glucono-δ-lactone + H_2O → D-gluconate

Kit size:	60 assays (manual) / 600 (microplate) / 600 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 6 min
Detection limit:	0.5 mg/L
Application examples:	Wine, meat, processed meat (e.g. additives), fruit juice, dairy products, pharmaceuticals, paper and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by ISO, DIN, GOST

Advantages

- All reagents stable for > 2 years after preparation
- Very competitive price (cost per test)
- Very rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

D-Glucosamine (plus Glucosamine-Sulphate and -Acetate) Cat. No. K-GAMINE

UV-method for the determination of D-Glucosamine, D-Glucosamine sulphate and *N*-Acetyl Glucosamine in food supplements, foodstuffs, beverages and other materials

Principle:

(desulphation)
(1) Glucosamine sulphate → D-glucosamine + sulphate

(deacetylation)
(2) *N*-Acetyl Glucosamine → D-glucosamine + acetate

(hexokinase)
(3) D-Glucosamine + ATP → D-glucosamine-6-P + ATP

(glucosamine 6-phosphate deaminase)
(4) D-Glucosamine-6-P + H_2O → D-fructose-6-P + NH_4^+

(phosphoglucose isomerase)
(5) F-6-P ⇔ G-6-P

(glucose-6-phosphate dehydrogenase)
(6) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

Kit size:	50 assays (manual) / 500 (microplate) / 500 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 8 min
Detection limit:	1.33 mg/L
Application examples:	Food supplements, food products and beverages
Method recognition:	***Novel method***

Advantages

- Novel product with simple format
- All reagents stable for > 2 years after preparation
- All enzymes supplied as stable suspensions
- Very rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

D-Glucose (GOPOD format) Cat. No. K-GLUC

Colourimetric method for the determination of D-Glucose in foodstuffs, beverages and other materials

Principle:

(glucose oxidase)
(1) D-Glucose + H_2O + O_2 → D-gluconate + H_2O_2

(peroxidase)
(2) $2H_2O_2$ + *p*-hydroxybenzoic acid + 4-aminoantipyrine → quinoneimine + $4H_2O$

Kit size:	660 assays
Method:	Spectrophotometric at 510 nm
Reaction time:	~ 20 min
Detection limit:	100 mg/L
Application examples:	Wine, beer, fruit juices, soft drinks, milk, jam, dietetic foods, bakery products, candies, fruit and vegetables, tobacco, cosmetics, pharmaceuticals, feed, paper and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Widely used and accepted in clinical chemistry and food analysis

Advantages

- All reagents stable for > 12 months after preparation
- Very competitive price (cost per test)
- Simple format
- Standard included

D-Glucose (Hexokinase format) — Cat. No. K-GLUHK

UV-method for the determination of D-Glucose in foodstuffs, beverages and other materials

Principle:

(hexokinase)

(1) D-Glucose + ATP → G-6-P + ADP

(glucose-6-phosphate dehydrogenase)

(2) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

Kit size:	(K-GLUHKR) 110 assays (manual) / 1100 (microplate) / 1000 (auto-analyser) or (K-GLUHKL) 220 assays (manual) / 2200 (microplate) / 2000 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 5 min
Detection limit:	0.66 mg/L
Application examples:	Wine, beer, fruit juices, soft drinks, milk, jam, dietetic foods, bakery products, candies, fruit and vegetables, tobacco, cosmetics, pharmaceuticals (e.g. infusions), feed, paper (and cardboard) and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by AOAC, EN, NEN, NF, DIN, GOST, OIV, IFU, AIJN, MEBAK

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

Glucose Oxidase — Cat. No. K-GLOX

Colourimetric method for the determination of Glucose Oxidase in foodstuffs and fermentation products

Principle:

(glucose oxidase)

(1) D-Glucose + H_2O + O_2 → D-glucono-δ-lactone + H_2O_2

(peroxidase)

(2) $2H_2O_2$ + *p*-hydroxybenzoic acid + 4-aminoantipyrine → quinoneimine + $4H_2O$

Kit size:	200 assays (manual) / 2000 (microplate) / 1960 (auto-analyser)
Method:	Spectrophotometric at 510 nm
Reaction time:	~ 20 min
Detection limit:	10 U/L
Application examples:	Enzyme preparations, and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Novel method***

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 12 months after preparation
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats


Feed


Biofuels

D-Glucuronic Acid / D-Galacturonic Acid — Cat. No. K-URONIC

UV-method for the determination of D-Glucuronic Acid or D-Galacturonic Acid in hydrolysates of plant material and polysaccharides and other materials

Principle:

(Uronate dehydrogenase; UDH)

(1) D-Glucuronic acid + NAD^+ + H_2O → D-glucarate + NADH + H^+

(Uronate dehydrogenase; UDH)

(2) D-Galacturonic acid + NAD^+ + H_2O → D-galactarate + NADH + H^+

Kit size:	100 assays (manual) / 1000 (microplate) / 1000 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Total assay time:	~ 10 min at 25˚C or ~ 5 min at 37˚C
Detection limit:	~ 17 mg/L
Application examples:	Hydrolysates of plant material and polysaccharides and other materials
Method recognition:	***Novel method***

Advantages

- Very cost effective
- All reagents stable for > 2 years during use
- Only test kit available
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats


Food


Feed


Fermentation


Biofuels

α-Glucuronidase — Cat. No. K-AGLUA

UV-method for the measurement of α-D-Glucuronidase in various enzyme preparations

Principle:

(α-D-glucuronidase)

(1) Aldouronic acid (tri:tetra:penta) + H_2O →
β-(1,4)-D-xylo-oligosaccharides + D-glucuronic acid

(uronate dehydrogenase; UDH)

(2) D-Glucuronic acid + NAD^+ + H_2O → D-glucarate + NADH + H^+

Kit size:	50 assays (manual) / 200 (microplate)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 25 min
Detection limit:	17 mU/mL
Application examples:	Enzyme preparations and other materials
Method recognition:	***Novel method***

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years as supplied
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual and microplate formats

L-Glutamic Acid

Cat. No. K-GLUT

Colourimetric method for the determination of L-Glutamic Acid (Monosodium Glutamate; MSG) in foodstuffs and other materials

Principle:

(beef liver glutamate dehydrogenase)

(1) L-Glutamic acid + NAD^+ + H_2O ↔ 2-oxoglutarate + NADH + NH_4^+

(diaphorase)

(2) INT + NADH + H^+ → NAD^+ + INT-formazan

Kit size:	60 assays (manual) / 600 (microplate) / 700 (auto-analyser)
Method:	Spectrophotometric at 492 nm
Reaction time:	~ 9 min
Detection limit:	0.21 mg/L
Application examples:	Fruit and vegetables (e.g. tomato), processed fruit and vegetables (e.g. tomato puree / juice, ketchup, soy sauce), condiments, processed meat products (e.g. extracts, bouillon and sausages), soup, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by ISO, GOST, NMKL

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Glutamate dehydrogenase solution stable at -20°C
- No wasted diaphorase solution (stable suspension supplied)
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

L-Glutamine / Ammonia (Rapid)

Cat. No. K-GLNAM

UV-method for the determination of L-Glutamine and Ammonia in cell culture media, foodstuffs and other materials

Principle:

(glutaminase)

(1) L-Glutamine + H_2O → L-glutamate + NH_4^+

(microbial glutamate dehydrogenase)

(2) NH_4^+ + 2-Oxoglutarate + NADPH → L-glutamate + $NADP^+$ + H_2O

Kit size:	50 assays of each
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 15 min
Detection limit:	0.54 mg/L (L-glutamine) 0.06 mg/L (ammonia)
Application examples:	Cell culture media and cultures, dietary supplements, vegetables and other materials (e.g. biological samples, etc.)
Method recognition:	***Novel method***

Advantages

- Very rapid reaction due to use of high activity glutaminase and uninhibited glutamate dehydrogenase
- All enzymes supplied as stabilised suspensions
- Only enzymatic kit available
- Very cost effective
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Glycerol — Cat. No. K-GCROL

UV-method for the determination of Glycerol in foodstuffs, beverages and other materials

Principle:

(glycerokinase)
(1) Glycerol + ATP → L-glycerol-3-phosphate + ADP

(pyruvate kinase)
(2) ADP + PEP → ATP + pyruvate

(L-lactate dehydrogenase)
(3) Pyruvate + NADH + H^+ → L-lactic acid + NAD^+

Kit size:	70 assays / 700 (microplate)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 5 min
Detection limit:	0.34 mg/L
Application examples:	Wine (and grape juice), beer, spirits, vinegar, marzipan, fruit juices, soft drinks, toothpaste, honey, tobacco, paper (and cardboard), cosmetics, pharmaceuticals, soap and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by OIV, MEBAK

Advantages

- Novel tablet format for increased stability
- Very competitive price (cost per test)
- All reagents stable for > 2 years as supplied
- Very rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual and microplate formats

Glycerol (ADP-GK format) — Cat. No. K-GCROLGK

UV-method for the determination of Glycerol in foodstuffs, beverages and other materials

Principle:

(glycerokinase)
(1) Glycerol + ATP → L-glycerol-3-phosphate + ADP

(ADP-GK)
(2) ADP + D-glucose → G-6-P + AMP

(glucose-6-phosphate dehydrogenase)
(3) G-6-P + NAD^+ → gluconate-6-phosphate + NADH + H^+

Kit size:	70 assays (manual) / 700 (microplate) / 600 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 7 min
Detection limit:	0.37 mg/L
Application examples:	Wine (and grape juice), beer, spirits, vinegar, marzipan, fruit juices, soft drinks, toothpaste, honey, tobacco, paper (and cardboard), cosmetics, pharmaceuticals, soap and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Novel method***

Advantages

- Novel tablet format for increased stability
- Very competitive price (cost per test)
- All reagents stable for > 2 years as supplied
- Very rapid reaction
- Positive reaction (assay proceeds with an increase in absorbance)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

D-3-Hydroxybutyric Acid

Cat. No. K-HDBA

Colourimetric method for the determination of D-3-Hydroxybutyric Acid in foodstuffs

Principle:

(3-hydroxybutyrate dehydrogenase)

(1) D-3-Hydroxybutyrate + NAD^+ ↔ acetoacetate + NADH + H^+

(diaphorase)

(2) INT + NADH + H^+ → NAD^+ + INT-formazan

Kit size:	60 assays (manual) / 600 (microplate) / 740 (auto-analyser)
Method:	Spectrophotometric at 492 nm
Reaction time:	~ 3 min
Detection limit:	0.20 mg/L
Application examples:	Egg, egg products (e.g. egg powder) and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by CEC

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Very rapid reaction (~ 3 min)
- No wasted diaphorase solution (stable suspension supplied)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

myo-Inositol

Cat. No. K-INOSL

Colourimetric method for the determination of *myo*-Inositol in various sample matrices

Principle:

(*myo*-inositol dehydrogenase)

(1) *myo*-Inositol + NAD^+ → 2,4,6/3,5-pentahydroxycyclohexanone + NADH + H^+

(diaphorase)

(2) INT + NADH + H^+ → NAD^+ + INT-formazan

Kit size:	50 assays
Method:	Spectrophotometric at 492 nm
Reaction time:	~ 10 min
Detection limit:	0.8 mg/L
Application examples:	Animal feeds, food, baby milk formulation and other materials
Method recognition:	***Novel method***

Advantages

- Very cost effective
- Reagents stable for > 2 years after preparation
- Only enzymatic kit available
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

D-Isocitric Acid

Cat. No. K-ISOC

UV-method for the determination of D-Isocitric Acid in foodstuffs

Principle:

(isocitrate dehydrogenase)

(1) D-Isocitric acid + $NADP^+$ → 2-oxoglutarate + CO_2 + NADPH + H^+

(pH 9-10)

(2) D-Isocitric acid ester + H_2O → D-isocitric acid + alcohol

(pH 9-10)

(3) D-Isocitric acid lactone + H_2O → D-isocitric acid

Kit size:	100 assays (manual) / 1000 (microplate) / 1000 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 3 min
Detection limit:	0.35 mg/L
Application examples:	Fruit juices, fruit products, soft drinks and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by EN, NEN, NF, DIN, GOST, IFU, AIJN

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- No wasted isocitrate dehydrogenase solution (stable suspension supplied)
- Very rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

D-Lactic Acid

Cat. No. K-DATE

UV-method for the determination of D-Lactic Acid in foodstuffs, beverages and other materials

Principle:

(D-lactate dehydrogenase)

(1) D-Lactic acid + NAD^+ ⇔ pyruvate + NADH + H^+

(glutamate-pyruvate transaminase)

(2) Pyruvate + D-glutamate → D-alanine + 2-oxoglutarate

Kit size:	50 assays (manual) / 500 (microplate) / 450 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 5 min
Detection limit:	0.21 mg/L
Application examples:	Wine, soft drinks, milk, dairy products (e.g. cream, milk / whey powder, cheese, condensed milk and yogurt), foods containing milk (e.g. dietetic foods, bakery products, baby food, chocolate, sweets and ice-cream), vinegar, fruit and vegetables, processed fruit and vegetables, meat products, food additives, paper (and cardboard), cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by DIN, GOST, IDF, EEC, EN, ISO, OIV, IFU, AIJN, MEBAK

Advantages

- Very rapid reaction with most samples (~ 5 min)
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

D- / L-Lactic Acid

Cat. No. K-DLATE

UV-method for the determination of D-/L-Lactic Acid in foodstuffs, beverages and other materials

Principle:

(D-lactate dehydrogenase)

(1) D-Lactic acid + NAD^+ ⇔ pyruvate + NADH + H^+

(L-lactate dehydrogenase)

(2) L-Lactic acid + NAD^+ ⇔ pyruvate + NADH + H^+

(glutamate-pyruvate transaminase)

(3) Pyruvate + D-glutamate → D-alanine + 2-oxoglutarate

Kit size:	50 assays of each
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 10 min (L-lactic acid) and ~ 5 min (D-lactic acid)
Detection limit:	0.21 mg/L
Application examples:	Wine, soft drinks, milk, dairy products, foods containing milk (e.g. dietetic foods, bakery products, baby food, chocolate, sweets and ice-cream), vinegar, fruit and vegetables, processed fruit and vegetables, meat products, food additives, paper (and cardboard), cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by DIN, GOST, IDF, EEC, EN, ISO, OIV, IFU, AIJN, MEBAK

Advantages

- Rapid total analysis time (concurrent / flexible D- and L-lactic acid reaction format)
- D-lactate dehydrogenase reaction very rapid with most samples (~ 5 min)
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included
- Extended cofactors stability

L-Lactic Acid

Cat. No. K-LATE

UV-method for the determination of L-Lactic Acid in foodstuffs, beverages and other materials

Principle:

(L-lactate dehydrogenase)

(1) L-Lactic acid + NAD^+ ⇔ pyruvate + NADH + H^+

(glutamate-pyruvate transaminase)

(2) Pyruvate + D-glutamate → D-alanine + 2-oxoglutarate

Kit size:	50 assays (manual) / 450 (microplate) / 500 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 10 min
Detection limit:	0.21 mg/L
Application examples:	Wine, beer, soft drinks, milk, dairy products (e.g. cream, milk / whey powder, cheese, condensed milk and yogurt), foods containing milk (e.g. dietetic foods, bakery products, baby food, chocolate, sweets and ice-cream), egg, egg products (e.g. egg powder), baking additives, vinegar, fruit and vegetables, processed fruit and vegetables (e.g. tomatoes), meat products, food additives, feed, paper (and cardboard), cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by DIN, GOST, IDF, EEC, EN, ISO, OIV, IFU, AIJN, MEBAK

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

Lactose / D-Galactose (Rapid) — Cat. No. K-LACGAR

UV-method for the determination of Lactose and D-Galactose in foodstuffs, beverages and other materials

Principle:

(β-galactosidase)
(1) Lactose + H_2O → β-D-galactose + D-glucose

(galactose mutarotase)
(2) α-D-Galactose ↔ β-D-galactose

(β-galactose dehydrogenase)
(3) β-D-Galactose + NAD^+ → D-galactonic acid + NADH + H^+

Kit size:	115 assays
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 15 min
Detection limit:	2.96 mg/L (lactose)
Application examples:	Milk, dairy products (e.g. cream, milk / whey powder, cheese, condensed milk and yogurt), foods containing milk (e.g. dietetic foods, bakery products, baby food, chocolate, sweets and ice-cream), food additives, feed, cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by AOAC, NBN, DIN, GOST, IDF

Advantages

- Very rapid reaction due to inclusion of galactose mutarotase (patented technology PCT/IE2004/00170)
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Lactose / Sucrose / D-Glucose — Cat. No. K-LACSU

Colourimetric method for the determination of Lactose, Sucrose and D-Glucose in foodstuffs, beverages and other materials

Principle:

(invertase)
(1) Sucrose + H_2O → D-glucose + D-fructose

(β-galactosidase)
(2) Lactose + H_2O → D-glucose + D-galactose

(glucose oxidase)
(3) D-Glucose + H_2O + O_2 → D-gluconate + H_2O_2

(peroxidase)
(4) $2H_2O_2$ + *p*-hydroxybenzoic acid + 4-aminoantipyrine → quinoneimine + $4H_2O$

Kit size:	100 assays of each
Method:	Spectrophotometric at 510 nm
Total assay time:	~ 60 min
Detection limit:	100 mg/L
Application examples:	Flours, beverages, dairy products, milk, foodstuffs containing milk, cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Used and accepted in food analysis

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 12 months after preparation
- Simple format
- Very specific
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included

Lactulose

Cat. No. K-LACTUL

UV-method for the determination of Lactulose in milk and foodstuffs containing dairy products

Principle:

(β-galactosidase)
(1) Lactulose + H_2O → D-galactose + D-fructose

(glucose oxidase + catalase + H_2O_2)
(2) D-Glucose + H_2O + O_2 → D-gluconic acid + H_2O_2

(hexokinase)
(3) D-Fructose + ATP → F-6-P + ADP

(phosphoglucose isomerase)
(4) F-6-P ↔ G-6-P

(glucose-6-phosphate dehydrogenase)
(5) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

(gluconate-6-phosphate dehydrogenase)
(6) Gluconate-6-phosphate + $NADP^+$ → ribulose-5-phosphate + NADPH + CO_2 + H^+

Kit size:	50 assays
Method:	Spectrophotometric at 340 nm
Total assay time:	~ 120 min
Detection limit:	4.8 mg/L
Application examples:	Milk, dairy products and foods containing milk
Method recognition:	***Novel method***

Advantages

- Twice the sensitivity of traditional hexokinase based lactulose methods
- Very cost effective
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

D-Malic Acid

Cat. No. K-DMAL

UV-method for the determination of D-Malic Acid in foodstuffs, beverages and other materials

Principle:

(D-malate dehydrogenase)
(1) D-Malic acid + NAD^+ → pyruvate + CO_2 + NADH + H^+

Kit size:	100 assays (manual) / 1000 (microplate) / 1100 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 6 min
Detection limit:	0.26 mg/L
Application examples:	Wine, beer, fruit juices, soft drinks, dietetic foods, candies, fruit and vegetables, cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by EEC, EN, DIN, OIV, IFU, and AIJN

Advantages

- No wasted D-malate dehydrogenase solution (stable suspension supplied)
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Rapid reaction (even with difficult samples)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

L-Malic Acid

Cat. No. K-LMAL

Manual format UV-method for the determination of L-Malic Acid in foodstuffs, beverages and other materials

Principle:

(L-malate dehydrogenase)

(1) L-Malic acid + NAD^+ ⇔ oxaloacetate + NADH + H^+

(glutamate-oxaloacetate transaminase)

(2) Oxaloacetate + L-glutamate → L-aspartate + 2-oxoglutarate

Kit size:	(K-LMALR) 58 assays (manual) / 580 (microplate) or (K-LMALL) 116 assays (manual) / 1160 (microplate)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 3 min
Detection limit:	0.25 mg/L
Application examples:	Wine, beer, fruit juices, soft drinks, candies, fruit and vegetables, bread, cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by AOAC, EEC, EN, NF, NEN, DIN, GOST, OIV, IFU, AIJN, MEBAK

Advantages

- PVP incorporated to prevent tannin inhibition
- Both enzymes supplied as stable suspensions
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Very rapid reaction (~ 3 min)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual and microplate formats

L-Malic Acid (Analyser format)

Cat. No. K-LMALAF

Analyser format UV-method for the determination of L-Malic Acid in foodstuffs, beverages and other materials

Principle:

(L-malate dehydrogenase)

(1) L-Malic acid + NAD^+ ⇔ oxaloacetate + NADH + H^+

(glutamate-oxaloacetate transaminase)

(2) Oxaloacetate + L-glutamate → L-aspartate + 2-oxoglutarate

Kit size:	245.5 mL of prepared reagent (R1 + R2)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 3 min
Detection limit:	20 mg/L (recommended assay)
Application examples:	Wine, beer, fruit juices, soft drinks, candies, fruit and vegetables, bread, cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by AOAC, EEC, EN, NF, NEN, DIN, GOST, OIV, IFU, AIJN, MEBAK

Advantages

- PVP incorporated to prevent tannin inhibition
- Very stable reagent when prepared for auto-analyser applications
- Linear calibration (R^2 ~ 0.9994) up to 80 µg/mL of L-malic acid in final reaction solution
- Validated by the University of Wine, Suze la Rousse, France
- Very competitive price (cost per mL of reagent)
- Both enzymes supplied as stable suspensions
- Very rapid reaction (~ 3 min)

L-Malic Acid Liquid Ready Reagents — Cat. No. K-LMALQR

UV-method suitable for microplate and auto-analyser formats for the determination of L-Malic Acid in foodstuffs, beverages and other materials

Principle:

(L-malate dehydrogenase)

(1) L-Malic acid + NAD^+ ⇔ oxaloacetate + NADH + H^+

(glutamate-oxaloacetate transaminase)

(2) Oxaloacetate + L-glutamate → L-aspartate + 2-oxoglutarate

Kit size:	1100 assays (microplate) / 1100 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 3 min
Detection limit:	166 mg/L (recommended format)
Application examples:	Wine, beer, fruit juices, soft drinks, candies, fruit and vegetables, bread, cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by AOAC, EEC, EN, NF, NEN, DIN, GOST, OIV, IFU, AIJN, MEBAK

Advantages

- PVP incorporated to prevent tannin inhibition
- "Ready to use" liquid stable formulation
- Very competitive price (cost per test)
- All reagents stable for > 18 months
- Very rapid reaction (~ 3 min)
- Standard included
- Suitable for microplate and auto-analyser formats

L-Malic Acid (*MegaQuant™* format) — Cat. No. K-LMALMQ

Simple colourimetric method for the determination of L-Malic Acid in foodstuffs, beverages and other materials

Principle:

(L-malate dehydrogenase)

(1) L-Malic acid + NAD^+ ⇔ oxaloacetate + NADH + H^+

(glutamate-oxaloacetate transaminase)

(2) Oxaloacetate + L-glutamate → L-aspartate + 2-oxoglutarate

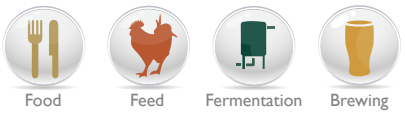
(diaphorase)

(3) INT + NADH + H^+ → NAD^+ + INT-formazan

Kit size:	60 assays
Method:	Spectrophotometric at 505 nm
Reaction time:	~ 6 min
Detection limit:	0.25 mg/L
Application examples:	Wine, beer, fruit juices, soft drinks, candies, fruit and vegetables, bread, cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Novel method***

Advantages

- Novel product, patented technology
- Highly stable reagents (at least three seasons use)
- Very competitive price (cost per test)
- Spectrophotometer / laboratory / expertise not required
- Very simple procedure
- Rapid reaction time (~ 6 min)
- Standard included



Malt Amylase

Cat. No. K-MALTA

Colourimetric method for the determination of α-Amylase and β-Amylase in cereal grains, malt, food, beverages and fermentation products

Principle:

(1) α-Amylase is measured using the "Ceralpha" Method as used in K-CERA

(2) β-Amylase is measured using the "Betamyl-3" Method as used in K-BETA3

Kit size:	50 assays of each
Method:	Spectrophotometric at 400 nm
Total assay time:	~ 20 min (Ceralpha Method) ~ 10 min (Betamyl-3 Method)
Detection limit:	0.05 U/mL
Application examples:	Cereal flours, malts, fermentation broths and other materials
Method recognition	
"Ceralpha" Method:	AOAC (Method 2002.01), AACC (Method 22-02.01), ICC (Standard No. 303), RACI (Standard Method) and CCFRA (Flour Testing Working Group Method 0018)
"Betamyl-3" Method:	RACI (Standard Method)

Advantages

- Very cost effective
- All reagents stable for > 2 years as supplied
- Only enzymatic kit available (Beta-Amylase)
- Very specific
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Maltose / Sucrose / D-Glucose

Cat. No. K-MASUG

UV-method for the determination of Maltose, Sucrose and D-Glucose in foodstuffs, beverages and other materials

Principle:

(1) Maltose + H_2O —(α-glucosidase)→ **D-glucose**

(2) Sucrose + H_2O —(β-fructosidase)→ **D-glucose + D-fructose**

(3) D-Glucose + ATP —(hexokinase)→ **G-6-P + ADP**

(4) G-6-P + $NADP^+$ —(glucose-6-phosphate dehydrogenase)→ **gluconate-6-phosphate + NADPH + H^+**

Kit size:	34 assays of each
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 13 min
Detection limit:	1.5 mg/L
Application examples:	Beer, fruit juices, soft drinks, milk, jam, honey, dietetic foods, baby foods, bread, sugar products, bakery products, candies, desserts, confectionery, chocolate, ice-cream, fruit and vegetables, condiments, tobacco, cosmetics, pharmaceuticals, paper and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by AOAC, EN, NEN, NF, DIN, GOST, OIV, IFU, AIJN, MEBAK

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included

D-Mannitol / L-Arabitol

Cat. No. K-MANOL

UV-method for the determination of D-Mannitol and L-Arabitol in foodstuffs and other materials

Principle:

(mannitol dehydrogenase)

(1) D-Mannitol + NAD^+ → D-fructose + NADH + H^+

(mannitol dehydrogenase)

(2) L-Arabitol + NAD^+ → L-xylulose + NADH + H^+

Kit size:	60 assays (manual) / 600 (microplate) / 580 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 6 min
Detection limit:	0.50 mg/L
Application examples:	Wine, chewing gum, dietetic foods, candies, cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Novel method***

Advantages

- Novel product (only enzymatic kit available)
- Very cost effective
- All reagents stable for > 2 years after preparation
- Simple format
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

D-Mannose / D-Fructose / D-Glucose

Cat. No. K-MANGL

UV-method for the determination of D-Mannose, D-Fructose and D-Glucose in foodstuffs, yeast cell preparations and other materials

Principle:

(hexokinase)

(1) D-Mannose / D-fructose / D-glucose + ATP → M-6-P / F-6-P / G-6-P + ADP

(glucose-6-phosphate dehydrogenase)

(2) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

(phosphomannose isomerase) (phosphoglucose isomerase)

(3) M-6-P ↔ F-6-P ↔ G-6-P

Kit size:	55 assays
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 30 min
Detection limit:	0.7 mg/L
Application examples:	Foodstuffs, yeast cell preparations, enzymatic hydrolysates and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Novel method***

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Only enzymatic kit available
- Simple format
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included

Food Feed

Pectin Identification

Cat. No. K-PECID

UV-method for the identification of Pectin in foodstuffs, feed and fruit juice

Principle:

(pH 12.5)

(1) Pectin + H_2O → pectate + methanol

(pectate lyase)

(2) Pectate → 4,5-unsaturated oligogalacturonates

Kit size:	500 assays
Method:	Spectrophotometric at 235 nm
Reaction time:	~ 30 min
Detection limit:	N/A
Application examples:	Food ingredients (e.g. citrus fruit and apple) and other materials
Method recognition:	JECFA

Advantages

- Very cost effective
- All reagents stable for > 2 years after preparation
- Only enzymatic kit available
- Simple format
- Standards included

Food Feed

Phytic Acid (Total Phosphorus)

Cat. No. K-PHYT

Colourimetric method for the determination of Phytic Acid in cereal products, seed materials, animal feeds and other materials

Principle:

(phytase)

(1) Phytic acid + H_2O → *myo*-Inositol (phosphate)$_n$ + P_i

(alkaline phosphatase)

(2) *myo*-Inositol (phosphate)$_n$ → *myo*-inositol + P_i

(3) P_i + ammonium molybdate → 12-molybdophosphoric acid

(diaphorase)

(4) 12-molybdophosphoric acid + H_2SO_4 / ascorbic acid → molybdenum blue

Kit size:	50 assays
Method:	Spectrophotometric at 655 nm
Reaction time:	25 min enzymic; 1 h for phosphate determination
Detection limit:	~ 11.3 mg phosphorus (~ 40 mg phytic acid) /100 g material
Application examples:	Seed materials, feeds and foodstuffs
Method recognition:	***Novel method***

Advantages

- Very cost effective
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Primary Amino Nitrogen (NOPA) — Cat. No. K-PANOPA

UV-method for the determination of Primary Amino Nitrogen in grape juice, must, wine and other materials

Principle:

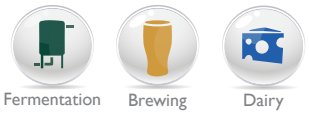
(room temperature)

(I) Amino nitrogen + *N*-acetyl-L-cysteine + *o*-phthaldialdehyde → isoindole derivative

Kit size:	100 assays (manual) / 1000 (microplate) / 1100 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 15 min
Detection limit:	2.59 mg N/L
Application examples:	Grape juice, must, wine and other materials
Method recognition:	***New method***

Advantages

- Simple format (absorbances read at 340 nm)
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats



Pyruvic Acid — Cat. No. K-PYRUV

UV-method for the determination of Pyruvic Acid in beer, cheese, fermentation products and other materials

Principle:

(D-lactate dehydrogenase)

(I) Pyruvate + NADH + H^+ → D-lactic acid + NAD^+

Kit size:	100 assays (manual) / 1000 (microplate) / 1000 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 3 min
Detection limit:	0.39 mg/L
Application examples:	Wine, beer, fruit juices, soft drinks, cheese, dietary supplements, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***New method***

Advantages

- Very cost effective
- All reagents stable for > 2 years after preparation
- Very rapid reaction (~ 3 min)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

Raffinose / D-Galactose — Cat. No. K-RAFGA

UV-method for the determination of Raffinose (also stachyose and verbascose) and D-Galactose in legume seeds, plant materials, foodstuffs and feed

Principle:

(α-galactosidase)

(1) Raffinose + stachyose + verbascose + H_2O → D-galactose + sucrose

(galactose mutarotase)

(2) α-D-Galactose ⇔ β-D-galactose

(β-galactose dehydrogenase)

(3) β-D-Galactose + NAD^+ → D-galactonic acid + NADH + H^+

Kit size:	120 assays
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 40 min
Detection limit:	5 mg/L
Application examples:	Cereal flours, soybean flour, by-products of sucrose manufacture and other materials
Method recognition:	Used and accepted in food analysis

Advantages

- Very rapid reaction due to inclusion of galactose mutarotase (patented technology)
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Raffinose / Sucrose / D-Glucose — Cat. No. K-RAFGL

Colourimetric method for the determination of Raffinose (also stachyose and verbascose), Sucrose and D-Glucose in legume seeds, plant materials, foodstuffs and feed

Principle:

(α-galactosidase)

(1) Raffinose + stachyose + verbascose + H_2O → D-galactose + sucrose

(invertase)

(2) Sucrose + H_2O → D-glucose + D-fructose

(glucose oxidase)

(3) D-Glucose + H_2O + O_2 → D-gluconate + H_2O_2

(peroxidase)

(4) $2H_2O_2$ + *p*-hydroxybenzoic acid + 4-aminoantipyrine → quinoneimine + $4H_2O$

Kit size:	120 assays
Method:	Spectrophotometric at 510 nm
Reaction time:	~ 20 min
Detection limit:	100 mg/L
Application examples:	Analysis of grain legumes and other materials containing raffinose, stachyose and verbascose
Method recognition:	Used and accepted in food analysis

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Simple format
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included

L-Rhamnose

Cat. No. K-RHAMNOSE

UV-method for the determination of L-Rhamnose in hydrolysates of plant material, polysaccharides, culture media / supernatants and other materials. Suitable for use with manual, microplate and auto-analyser formats.

Principle:

(L-rhamnose dehydrogenase)

(1) L-Rhamnose + NAD^+ → L-rhamno-1,4-lactone + NADH + H^+

Kit size:	50 / 100 assays (manual) / 550 (microplate) / 550 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Total assay time:	~ 5 min at 25°C or ~ 4 min at 37°C
Detection limit:	~ 1.2 mg/L
Application examples:	Hydrolysates of plant material and polysaccharides, culture media / supernatants and other materials
Method recognition:	***Novel method***

Advantages

- Very cost effective
- All reagents stable for > 2 years during use
- Only test kit available
- Simple format
- Rapid reaction (~ 5 min at 25°C or ~ 4 min at 37°C)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

D-Sorbitol / Xylitol

Cat. No. K-SORB

Colourimetric method for the determination of D-Sorbitol and Xylitol in foodstuffs and wine

Principle:

(sorbitol dehydrogenase)

(1) D-Sorbitol + NAD^+ ⇔ D-fructose + NADH + H^+

(sorbitol dehydrogenase)

(2) Xylitol + NAD^+ ⇔ D-xylulose + NADH + H^+

(diaphorase)

(3) INT + NADH + H^+ → NAD^+ + INT-formazan

Kit size:	58 assays (manual) / 580 (microplate) / 700 (auto-analyser)
Method:	Spectrophotometric at 492 nm
Reaction time:	~ 15 min
Detection limit:	0.20 mg/L
Application examples:	Diabetic foods (e.g. honey, jam and chocolate), dietetic foods, chewing gum, candies, fruit juice (e.g. apple juice), ice-cream, sweets, bakery products (e.g. desserts), marzipan, paper (and cardboard), cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by IFU, AIJN

Advantages

- Each vial of sorbitol dehydrogenase is stable for > 2 months at 4°C after dissolution
- No wasted diaphorase solution (stable suspension supplied)
- Very competitive price (cost per test)
- Reagents stable for > 2 years as supplied
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

Food Feed

Starch Damage

Cat. No. K-SDAM

Colourimetric method for the determination of Starch Damage in cereal flours

Principle:

(fungal α-amylase)

(1) Damaged (or gelatinised) starch + H_2O → maltodextrins

(amyloglucosidase)

(2) Maltodextrins + H_2O → D-glucose

(glucose oxidase)

(3) D-Glucose + H_2O + O_2 → D-gluconate + H_2O_2

(peroxidase)

(4) $2H_2O_2$ + *p*-hydroxybenzoic acid + 4-aminoantipyrine → quinoneimine + $4H_2O$

Kit size:	200 assays
Method:	Spectrophotometric at 510 nm
Total assay time:	~ 40 min
Detection limit:	0.5-100% of sample weight
Application examples:	Cereal flours and other materials
Method recognition:	AACC (Method 76-31.01), ICC (Standard No. 164), and RACI (Standard Method)

Advantages

- Very cost effective
- All reagents stable for > 2 years as supplied
- Only enzymatic kit available
- Very specific
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included

Food Feed

Resistant Starch

Cat. No. K-RSTAR

Colourimetric method for the determination of Resistant Starch in cereal products and feeds

Principle:

(α-amylase + amyloglucosidase)

(1) Non-resistant starch + H_2O → D-glucose + maltose (trace)

(2) Aqueous ethanol wash + centrifugation to remove D-glucose + maltose

(3) Dissolution of resistant starch pellet in KOH and neutralisation

(α-amylase + amyloglucosidase)

(4) Dissolved resistant starch + H_2O → D-glucose

(glucose oxidase)

(5) D-Glucose + H_2O + O_2 → D-gluconate + H_2O_2

(peroxidase)

(6) $2H_2O_2$ + *p*-hydroxybenzoic acid + 4-aminoantipyrine → quinoneimine + $4H_2O$

Kit size:	100 assays
Method:	Spectrophotometric at 510 nm
Total assay time:	~ 120 min (plus overnight incubation)
Detection limit:	2-100% of sample weight
Application examples:	Plant materials, starch samples and other materials
Method recognition:	AOAC (Method 2002.02), AACC (Method 32-40.01) and CODEX (Type II Method)

Advantages

- Very cost effective
- All reagents stable for > 2 years as supplied
- Only enzymatic kit available
- Measures enzyme resistant starch
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Total Starch (GOPOD format) — Cat. No. K-TSTA

Colourimetric method for the determination of Total Starch in cereal products, feeds, foodstuffs and other materials

Principle:

(α-amylase, 100°C ± DMSO)
(1) Starch granules + H_2O → maltodextrins

(amyloglucosidase)
(2) Maltodextrins + H_2O → D-glucose

(glucose oxidase)
(3) D-Glucose + H_2O + O_2 → D-gluconate + H_2O_2

(peroxidase)
(4) $2H_2O_2$ + *p*-hydroxybenzoic acid + 4-aminoantipyrine → quinoneimine + $4H_2O$

Kit size:	100 assays
Method:	Spectrophotometric at 510 nm
Total assay time:	~ 90 min
Detection limit:	1-100% of sample weight
Application examples:	Cereal flours, food products and other materials
Method recognition:	AOAC (Method 996.11), AACC (Method 76-13.01), ICC (Standard Method No. 168), and RACI (Standard Method)

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 12 months after preparation
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Total Starch (Hexokinase format) — Cat. No. K-TSHK

UV-method for the determination of Total Starch in grains, animal feeds, foodstuffs and other materials

Principle:

(α-amylase, 100°C ± DMSO)
(1) Starch granules + H_2O → maltodextrins

(amyloglucosidase)
(2) Maltodextrins + H_2O → D-glucose

(hexokinase)
(3) D-Glucose + ATP → G-6-P + ADP

(glucose-6-phosphate dehydrogenase)
(4) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

Kit size:	100 assays
Method:	Spectrophotometric at 340 nm
Total assay time:	~ 90 min
Detection limit:	1-100% of sample weight
Application examples:	Cereal flours, food products and other materials
Method recognition:	AOAC (Method 996.11), AACC (Method 76-13.01), ICC (Standard Method No. 168), and RACI (Standard Method)

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included

Succinic Acid

Cat. No. K-SUCC

UV-method for the determination of Succinic Acid in foodstuffs, feed, wine and other materials

Principle:

(succinyl-CoA synthetase)
(1) Succinic acid + ATP + CoA → ADP + succinyl-CoA + P_i

(pyruvate kinase)
(2) ADP + PEP → ATP + pyruvate

(L-lactate dehydrogenase)
(3) Pyruvate + NADH + H^+ → NAD^+ + L-lactic acid

Kit size:	20 assays (manual) / 200 (microplate) / 270 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 6 min
Detection limit:	0.26 mg/L
Application examples:	Wine, fruit and vegetables, soy sauce, cheese, egg, egg products and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by EEC

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years as supplied
- Very rapid reaction (even at room temperature)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

Sucrose / D-Fructose / D-Glucose

Cat. No. K-SUFRG

UV-method for the determination of Sucrose, D-Fructose and D-Glucose in foodstuffs, beverages and other materials

Principle:

(β-fructosidase)
(1) Sucrose + H_2O → D-glucose + D-fructose

(hexokinase)
(2) D-Glucose + ATP → G-6-P + ADP

(hexokinase)
(3) D-Fructose + ATP → F-6-P + ADP

(glucose-6-phosphate dehydrogenase)
(4) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

(phosphoglucose isomerase)
(5) F-6-P ↔ G-6-P

Kit size:	50 assays of each
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 30 min
Detection limit:	1.38 mg/L
Application examples:	Beer, fruit juices, soft drinks, milk, jam, honey, dietetic foods, bread, bakery products, dairy products, candies, desserts, confectionery, sweets, ice-cream, fruit and vegetables (e.g. potato), meat products (e.g. sausage), condiments (e.g. ketchup and mustard), feed, tobacco, cosmetics, pharmaceuticals, paper and other materials
Method recognition:	Methods based on this principle have been accepted by NF, EN, NEN, DIN, GOST, IFU, AIJN, MEBAK, IOCCC

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- Rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Stabilised D-glucose / D-fructose standard solution included
- Extended cofactors stability

Sucrose / D-Glucose (GOPOD format) — Cat. No. K-SUCGL

Colourimetric method for the determination of Sucrose and D-Glucose in foodstuffs, beverages and other materials

Principle:

(glucose oxidase)

(1) D-Glucose + H_2O + O_2 → D-gluconate + H_2O_2

(peroxidase)

(2) $2H_2O_2$ + *p*-hydroxybenzoic acid + 4-aminoantipyrine → quinoneimine + $4H_2O$

(β-fructosidase)

(3) Sucrose + H_2O → D-glucose + D-fructose

Kit size:	250 assays
Method:	Spectophotometric at 510 nm
Reaction time:	~ 30 min
Detection limit:	100 mg/L
Application examples:	Beer, fruit juices, soft drinks, coffee, milk, jam, honey, dietetic foods, bread, bakery products, candies, chocolate, desserts, confectionery, ice-cream, fruit and vegetables, condiments, tobacco, cosmetics, pharmaceuticals, paper and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Used and accepted in food analysis

Advantages

- Very competitive price (cost per test)
- All reagents stable for > 12 months after preparation
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standards included

Total Sulphite — Cat. No. K-TSULPH

Colourimetric methods for the determination of Total Sulphite in wine, fruit juice, foodstuffs and other materials

Principle:

The Total Sulphite assay is based on the reaction principle between thiol groups and Ellman's reagent

Kit size:	80 assays (manual) / 800 (microplate) / 800 (auto-analyser)
Method:	Spectrophotometric at 405 nm
Total assay time:	~ 6 min
Detection limit:	~ 5 mg/L
Application examples:	Wine, fruit juice, sea food, food stuffs and other materials
Method recognition:	Validated for red and white wines at the Bundesamt für Weinbau, Austria. Used widely in the wine industry

Advantages

- "Ready to use" liquid stable formulation
- Very competitive price (cost per test)
- All reagents stable for > 18 months
- Very rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

Total Sulphite (Enzymatic) — Cat. No. K-ETSULPH

UV-method for the determination of Total Sulphite (SO_2^{2-}) in beverages, foodstuffs and other materials

Principle:

(sulphite oxidase)

(1) $SO_3^{2-} + O_2 + H_2O \Leftrightarrow SO_4^{2-} + H_2O_2$

(NADH - peroxidase)

(2) $H_2O_2 + NADH + H^+ \rightarrow 2\ H_2O + NAD^+$

Kit size:	50 assays (manual) / 500 (microplate) / 588 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Total assay time:	~ 30 min
Detection limit:	0.3 mg/L
Application examples:	Wine, beer, fruit juices, soft drinks, jam, fruit and vegetables, pharmaceuticals and other materials
Method recognition:	Methods based on this principle have been accepted by DIN, EN, MEBAK and NMKL

Advantages

- Very cost effective
- All reagents stable for > 2 years during use
- Simple format
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability
- Suitable for manual, microplate and auto-analyser formats

Total and Free Sulphite — Cat. No. K-SULPH

Colourimetric methods for the determination of Total and Free Sulphite in wine, fruit juice, foodstuffs and other materials

Principle:

The Total Sulphite assay is based on the reaction principle between thiol groups and Ellman's reagent

The Free Sulphite assay is based on the reaction principle of SO_2, fuchsin and aldehyde binding

Kit size:	40 assays (manual) / 400 (microplate) / 400 (auto-analyser)
Method:	Total sulphite: Spectrophotometric at 405 nm Free sulphite: Spectrophotometric at 575 nm
Total assay time:	Total sulphite: ~ 6 min Free sulphite: ~ 9 min
Detection limit:	Total sulphite: ~ 5 mg/L Free sulphite: ~ 2 mg/L
Application examples:	Wine, fruit juice, seafood, food stuffs and other materials
Method recognition:	Validated for red and white wines at the Bundesamt für Weinbau, Austria. Used widely in the wine industry

Advantages

- "Ready to use" liquid stable formulation
- Very competitive price (cost per test)
- All reagents stable for > 18 months
- Very rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

Tartaric Acid

Cat. No. K-TART

Colourimetric method for the determination of Tartaric Acid in wine, fruit juice and other materials

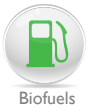
Principle:

The Tartaric acid assay is based on the reaction principles between tartaric acid and vanadate

Kit size:	200 assays (manual) / 2000 (microplate) / 2000 (auto-analyser)
Method:	Spectrophotometric at 505 nm
Total assay time:	~ 4 min
Detection limit:	~ 108 mg/L
Application examples:	Wine, fruit juice and other materials
Method recognition:	Used widely in the wine industry

Advantages

- "Ready to use" liquid stable formulation
- Very competitive price (cost per test)
- All reagents stable for > 1 year
- Very rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats



Trehalose / D-Glucose

Cat. No. K-TREH

UV-method for the determination of Trehalose and D-Glucose in foodstuffs, beverages, and other materials

Principle:

(trehalase)
(1) Trehalose + H_2O → D-glucose

(hexokinase)
(2) D-Glucose + ATP → G-6-P + ADP

(glucose-6-phosphate dehydrogenase)
(3) G-6-P + $NADP^+$ → gluconate-6-phosphate + NADPH + H^+

Kit size:	100 assays (manual) / 1000 (microplate) / 1100 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 8 min
Detection limit:	37.5 mg/L
Application examples:	Honey, mushrooms, bread, beer, seafood (e.g. lobster and shrimp), fruit juices, purees and fillings, nutrition bars, surimi, dehydrated fruits and vegetables, fruit products, white chocolate, sports drinks, dairy products, egg products, soups and sauces, confectionery, chewing gum, cosmetics, pharmaceuticals and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	***Novel method***

Advantages

- Only enzymatic kit available
- Very cost effective
- All reagents stable for > 2 years after preparation
- Very rapid reaction
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

Urea / Ammonia (Rapid) — Cat. No. K-URAMR

UV-method for the determination of Urea and Ammonia in foodstuffs, beverages and other materials

Principle:

$$\text{(1) Urea} + H_2O \xrightarrow{\text{(urease)}} 2NH_3 + CO_2$$

$$\text{(2) 2-Oxoglutarate} + \text{NADPH} + NH_4^+ \xrightarrow{\text{(microbial glutamate dehydrogenase)}} \text{L-glutamic acid} + \text{NADP}^+ + H_2O$$

Kit size:	50 assays of each
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 8 min
Detection limit:	0.13 mg/L (urea) 0.07 mg/L (ammonia)
Application examples:	Wine, grape juice, must, fruit juices, soft drinks, milk, cheese, meat, processed meat, bakery products, seafood, fertilizers, feed, pharmaceuticals, cosmetics, water (e.g. swimming-pool water), Kjeldahl analysis, paper (and cardboard) and other materials (e.g. biological cultures, samples, etc.)
Method recognition:	Methods based on this principle have been accepted by NEN, MEBAK

Advantages

- Very rapid reaction due to use of uninhibited glutamate dehydrogenase
- Enzymes supplied as stable suspensions
- Very competitive price (cost per test)
- All reagents stable for > 2 years after preparation
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Extended cofactors stability

Xylanase (Azo-Wax format) — Cat. No. K-AZOWAX

Colourimetric method for the determination of Xylanase in feed, foodstuffs and other materials

Principle:

$$\text{(1) Azo-WAX} + H_2O \xrightarrow{\text{(β-xylanase)}} \text{Azo-WAX fragments}$$

(insoluble in aqueous alcohol) (soluble in aqueous alcohol)

Kit size:	200 assays
Method:	Based on use of Azo-WAX reagent (590 nm)
Total assay time:	~ 45 min
Detection limit:	0.2 U/mL of assay solution
Application examples:	Animal feeds, enzyme preparations, bread improver mixtures and other materials
Method recognition:	Used widely in the feed industry

Advantages

- Very cost effective
- All reagents stable for > 2 years
- Only test kit available
- Simple format
- Standard included

Xylanase (Xylazyme AX format) — Cat. No. K-XYLS

Colourimetric method for the determination of Xylanase in feed, foodstuffs and other materials

Principle:

(β-xylanase)

(1) Xylazyme AX (water insoluble) + H_2O → water soluble dyed xylan fragments

Kit size:	200 assays
Method:	Based on use of Xylazyme AX tablets (590 nm)
Total assay time:	~ 45 min
Detection limit:	0.02 U/mL of assay solution
Application examples:	Animal feeds, enzyme preparations, bread improver mixtures and other materials
Method recognition:	Used widely in the feed industry

Advantages

- Very cost effective
- All reagents stable for > 2 years during use
- Only test kit available
- Simple format
- Standards included

D-Xylose — Cat. No. K-XYLOSE

UV-method for the determination of D-Xylose in fermentation broths and hydrolysates of plant material and polysaccharides

Principle:

(xylose mutarotase)

(1) α-D-Xylose ⇔ β-D-xylose

(β-xylose dehydrogenase)

(2) β-D-Xylose + NAD^+ → D-xylonic acid + NADH + H^+

Kit size:	100 assays (manual) / 1000 (microplate) / 1300 (auto-analyser)
Method:	Spectrophotometric at 340 nm
Reaction time:	~ 6 min
Detection limit:	0.7 mg/L
Application examples:	Analysis of D-xylose in fermentation broths and hydrolysates of plant material and polysaccharides
Method recognition:	***Novel method***

Advantages

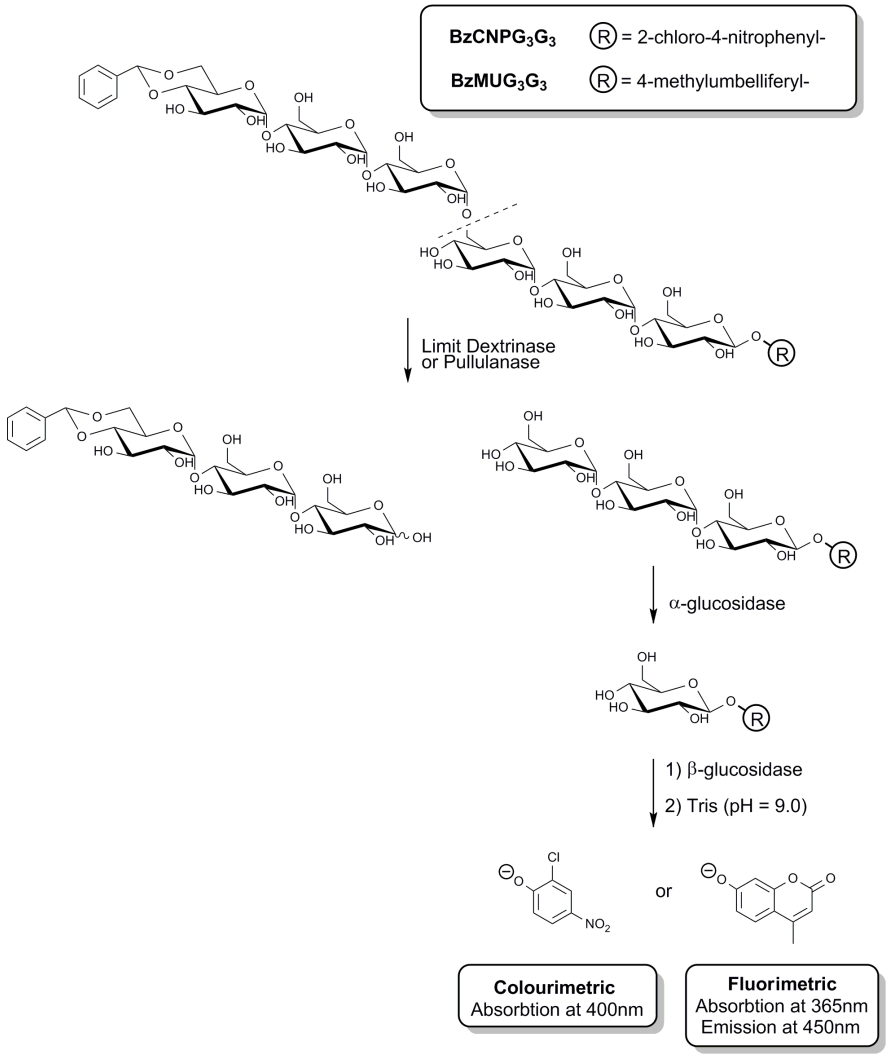
- Very cost effective
- Reagents stable for > 2 years after preparation
- Only enzymatic kit available
- Rapid reaction (~ 6 min)
- *Mega-Calc*™ software tool is available from our website for hassle-free raw data processing
- Standard included
- Suitable for manual, microplate and auto-analyser formats

Limit-Dextrinase / Pullulanase (Under Development) Cat. No. K-LDPU

Available soon...

Colourimetric method for the determination of Limit-Dextrinase or Pullulanase in grain extracts, feed and fermentation products

Principle:



Kit size:	100 / 200 assays
Method:	Spectrophotometric at 400 nm (BzCNPG3G3) Fluorimetric at 450nm (BzMUG3G3)
Total assay time:	~ 10 min
Detection limit:	0.05 u/mL
Application examples:	Cereal flours, fermentation broths, and other materials
Method recognition:	***Novel method***

Advantages

- Suitable for manual and auto-analyser formats
- Very cost effective
- All reagents stable for > 2 years after preparation
- Very specific
- Simple format
- Mega-Calc™ software tool is available from our website for hassle-free raw data processing
- Standard included

ENZYMES...

Enzymes

Megazyme stocks a wide range of ultra-pure enzymes for use in analytical, diagnostic and research applications. These enzymes are either produced recombinantly through various expression systems or are purified using conventional protein purification techniques from crude industrial enzyme formulations.

Diversity

Megazyme's enzyme portfolio is constantly expanding and we are always keen to receive enzyme suggestions from customers. The bulk of Megazyme's enzymes are carbohydrate acting enzymes (CAZymes) and cover 36 CAZy families - 31 glycoside hydrolase (GH) families, three polysaccharide lyase (PL) families and two carbohydrate esterase (CE) families. A wide range of analytical enzymes including kinases and isomerases are also available.

Purity

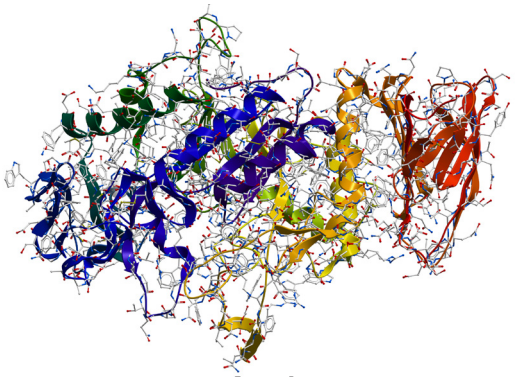
Megazyme prides itself on the purity of our enzymes and reagents. As an example we supply the enzymes required for the analysis of dietary fiber by the official AOAC methods, namely α-amylase, amyloglucosidase and protease. The quality of these enzymes is of paramount importance for use in this assay and Megazyme proudly provides the highest purity level commercially available globally.

Stability

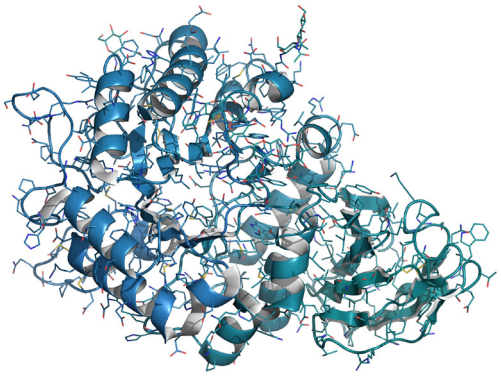
Megazyme enzymes are provided in various formats including freeze-dried powder, ammonium sulphate suspension and 50% glycerol solution. All enzymes have undergone rigorous stability studies and recommended storage conditions are provided with every product.

Background Information

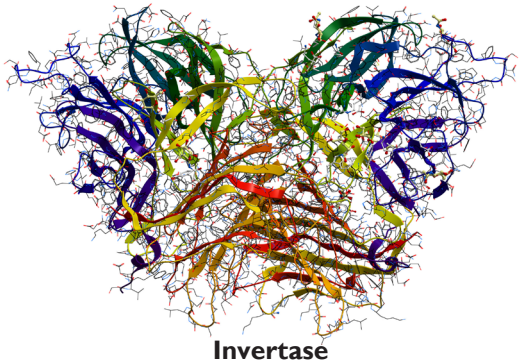
Every enzyme is extensively characterised by our R&D scientists. A data sheet is shipped with each enzyme describing specific activity on a suitable substrate and relative activity on any other relevant substrates. The data sheet also describes pH and temperature activity optima along with pH and temperature stability data. These data sheets are also available on every product page at www.megazyme.com.



α-Amylase



α-Galactosidase



Invertase

Cat. No.	Product
	ENZYMES
E-ACSBS	RecAcetyl-CoA synthetase (*B. subtilis*)
E-OGLYEF	Rec*endo*-α–*N*-Acetylgalactosaminidase *(E. faecalis)*
E-ANAGM	Recα–*N*-Acetylgalactosaminidase (microbial)
E-BNAHEX	Recβ-*N*-Acetylhexosaminidase (microbial)
E-AXEAO	RecAcetylxylan esterase (*Orpinomyces sp.*)
E-ACPEC	RecPhosphatase (acid) (*E. coli*)
E-AMPK	RecAdenylate kinase (myokinase) (prokaryote)
E-ADHEC	RecAlcohol dehydrogenase (*E. coli*)
E-ALGLS	RecAlginate lyase (*Sphingomonas sp.*)
E-ALPEC	RecPhosphatase (Alkaline) (*E. coli*)
E-ANAAM	α-Amylase (*A. oryzae*)
E-BAASS	α-Amylase (*B. amyloliquefaciens*)
E-BLAAM	α-Amylase (*B. licheniformis*)
E-BAM	α-Amylase (*B. licheniformis*)NEW
E-PANAA	α-Amylase (Porcine Pancreatic)
E-BARBL	β-Amylase (barley; liquid)
E-BARBP	β-Amylase (barley; powder)
E-BAMBC	Recβ-Amylase (*B. cereus*)
E-AMGDF	Amyloglucosidase (*A. niger*)NEW

Cat. No.	Product
E-AMGDFPD	Amyloglucosidase (powder) (*A. niger*)NEW
E-AMGFR	Amyloglucosidase (*A. niger*)
E-AMGPU	Amyloglucosidase (*Rhizopus sp.*)
E-EARAB	*endo*-1,5-α-L-Arabinanase (*A. niger*)
E-AFASE	α-L-Arabinofuranosidase (*A. niger*)
E-AFAM2	Recα-L-Arabinofuranosidase (novel specificity)
E-ABFCJ	Recα-L-Arabinofuranosidase (*C. japonicus*)
E-ABFCT	Recα-L-Arabinofuranosidase (*C. thermocellum*)
E-ABFUM	Recα-L-Arabinofuranosidase (*U. maydis*)NEW
E-ARBACJ	Rec*endo*-/*exo*-Arabinanase (*C. japonicus*)
E-ASNEC	RecAsparaginase (*E. coli*)
E-DIPEP	Recα-Aspartyl dipeptidase (*E. coli*)
E-CBHI	Cellobiohydrolase I (*T. longibrachiatum*)
E-CELAN	Cellulase (*endo*-1,4-β-D-glucanase) (*A. niger*)
E-CELBA	RecCellulase (*endo*-1,4-β-D-glucanase) (*B. amyloliquefaciens*)
E-CELTE	Cellulase (*endo*-1,4-β-D-glucanase) (*T. emersonii*)
E-CELTR	Cellulase (*endo*-1,4-β-D-glucanase) (*T. longibrachiatum*)
E-CELTM	RecCellulase (*endo*-1,4-β-D-glucanase) (*T. maritima*)
E-CITEC	RecCitrate synthase (*E. coli*)
E-CREA	RecCreatinase (*Bacillus sp.*)

Cat. No.	Product
E-CMPK	Rec Cytidylate kinase (prokaryote)
E-DIAEC	Rec Diaphorase (*E. coli*)
E-FAERU	Rec Feruloyl esterase (rumen microorganism)
E-FAEZCT	Rec Feruloyl esterase *(C. thermocellum)*
E-FDHCB	Rec Formate dehydrogenase (*C. boidinii*)
E-FRMXLQ	Fructanase mixture (purified; liquid)
E-FRMXPD	Fructanase mixture (purified; powder)
E-FUCTM	Rec α-Fucosidase (thermostable) (*T. maritima*) NEW
E-FUCM	1,2-α-L-Fucosidase (microbial)
E-EGALN	*endo*-1,4-β-D-Galactanase (*A. niger*)
E-GALCJ	Rec *endo*-1,4-β-D-Galactanase (*C. japonicus*)
E-GALCT	Rec *endo*-1,4-β-D-Galactanase (*C. thermocellum*)
E-GALDH	Rec Galactose dehydrogenase (soil prokaryote)
E-GALMUT	Rec Galactose dehydrogenase / Galactose mutarotase
E-AGLAN	α-Galactosidase (*A. niger*)
E-AGLANP	α-Galactosidase (*A. niger*) powder
E-AGALPS	Rec α-Galactosidase (*P. simplicissimum*) NEW
E-AGLGU	α-Galactosidase (guar)
E-BGLAN	β-Galactosidase (*A. niger*)
E-LICACT	Rec Non-specific *endo*-1,3(4)-β-Glucanase (*C. thermocellum*)
E-EXBGOS	*exo*-1,3-β-D-Glucanase / β-Glucosidase
E-LAMSE	*endo*-1,3-β-D-Glucanase (*Trichoderma sp.*)
E-LAMHV	Rec *endo*-1,3-β-D-Glucanase (barley)
E-EXG5AO	Rec *exo*-1,3-β-D-Glucanase (*Aspergillus oryzae*)
E-EXBGL	*exo*-1,3-β-D-Glucanase (*Trichoderma sp.*)
E-EXBGTV	Rec *exo*-1,3-β-D-Glucanase (*T. virens*)
E-GAMP	Rec Glucoamylase P (*H. resinae*) NEW
E-GLUKEC	Rec Gluconokinase (*E. coli*)
E-GOX	Glucose oxidase (*Aspergillus sp.*) NEW
E-GOXCA	Glucose oxidase / Catalase mixture (eukaryote)
E-GPDH5	Glucose-6-phosphate dehydrogenase *(L. mesenteroides)*
E-GPDHEC	Rec Glucose-6-phosphate dehydrogenase (*E. coli*)
E-TSAGL	α-Glucosidase (*B. stearothermophilus*)
E-TSAGS	Rec α-Glucosidase *(B. stearothermophilus)*
E-AGLUTM	Rec α-Glucosidase (thermostable) *(T. maritima)* NEW
E-MALTS	α-Glucosidase (maltase) (yeast)
E-TRNGL	α-Glucosidase (transglucosidase) (*A. niger*)
E-OAGUM	Oligo-α-1,6-Glucosidase
E-MALBS	Oligo-α-1,4(6)-Glucosidase (*B. subtilis*) NEW
E-BGLUC	β-Glucosidase (*A. niger*)
E-BGOSAG	Rec β-Glucosidase (*Agrobacterium sp.*)
E-BGOSPC	Rec β-Glucosidase (thermostable) (*P. chrysosporium*)
E-BGOSTM	Rec β-Glucosidase (thermostable) (*T. maritima*)
E-BGLAEC	Rec β-Glucuronidase *(E. coli)*
E-AGUBS	Rec α-Glucuronidase *(G. stearothermophilus)*
E-GOTEC	Rec Glutamate oxaloacetate transaminase (*E. coli*)
E-GPTBS	Rec Glutamate pyruvate transaminase (*B. subtilis*)
E-GLUTEC	Rec Glutaminase (*E. coli*)
E-GPO	Rec Glycerol 3-phosphate oxidase
E-GMPK	Rec Guanylate kinase (prokaryote)
E-HEX10	Hexokinase (yeast)
E-HKGDH	Hexokinase / Glucose-6-phosphate dehydrogenase
E-HYLSP	Rec Hyaluronate lyase (novel specificity) (soil prokaryote)
E-HBDH	Rec 3-Hydroxybutyrate dehydrogenase (prokaryote)
E-INDHBS	Rec *myo*-Inositol dehydrogenase (*B. subtilis*)
E-ENDOIAN	Rec *endo*-Inulinase (*A. niger*)
E-EXOIAN	Rec *exo*-Inulinase (*A. niger*)
E-INVRT	Invertase (fructofuranosidase) (yeast)

Cat. No.	Product
E-INVPD	Invertase (powder)
E-ISAMY	Isoamylase (glycogen 6-glucanohydrolase)
E-ICDHBS	Rec Isocitrate dehydrogenase (*B. subtilis*)
E-DLDHLM	Rec D-Lactate dehydrogenase (*L. mesenteroides*)
E-LLDHP	L-Lactate dehydrogenase (Porcine)
E-LICHN	Lichenase (*endo*-1,3(4)-β-D-glucanase) (*Bacillus sp.*)
E-DMDHEC	Rec D-Malate dehydrogenase (*E. coli*)
E-LMDHEC	Rec L-Malate dehydrogenase (*E. coli*)
E-BMANN	*endo*-1,4-β-Mannanase (*A. niger*)
E-BMABS	*endo*-1,4-β-Mannanase (*Bacillus sp.*)
E-BMACJ	Rec *endo*-1,4-β-Mannanase (*C. japonicus*)
E-BMATM	Rec *endo*-1,4-β-Mannanase (*T. maritima*)
E-BMABC	Rec β-Mannanase (*B. circulans*) NEW
E-MNHPF	Rec Mannitol dehydrogenase (*P. fluorescens*)
E-BMOSCF	Rec β-Mannosidase (*C. fimi*)
E-MAST	Malt Amylase Standard
E-PEROX	Peroxidase (Horse radish) NEW
E-NADHPO	Rec Peroxidase (NADH peroxidase) *(E. faecalis)*
E-PCLYAN	Pectate lyase (*Aspergillus sp.*)
E-PCLYAN2	Pectate lyase (*Aspergillus sp.*)
E-PLYCJ	Rec Pectate lyase (*C. japonicus*)
E-PGDHEC	Rec 6-Phosphogluconate dehydrogenase (*E. coli*)
E-PGIBS	Rec Phosphoglucose isomerase (*B. subtilis*)
E-PGIEC	Rec Phosphoglucose isomerase (*E. coli*)
E-PGISC	Rec Phosphoglucose isomerase (*S. cerevisiae*)
E-PGM	Rec Mutase (α-Phosphoglucomutase) (microbial)
E-PMIEC	Rec Phosphomannose isomerase (*E. coli*)
E-PTABS	Rec Phosphotransacetylase (*B. subtilis*)
E-PGALUSP	*endo*-Polygalacturonanase M2 (*A. aculeatus*)
E-BSPRPD	Protease (subtilisin A) (*B. licheniformis*)
E-BSPRT	Protease (subtilisin A) (*B. licheniformis*)
E-PULKP	Pullulanase M1 (*K. planticola*)
E-PULBL	Pullulanase M2 (*B. licheniformis*)
E-ISPUAN	Isopullulanase (*A. niger*) NEW
E-RHAMS	Rec α-Rhamnosidase (prokaryote)
E-SIALCP	Rec *exo*-α-Sialidase (*C. perfringens*)
E-SIALST	Rec *exo*-α-Sialidase (*S. typhimurium*)
E-SCOAS	Rec Succinyl-CoA synthetase (prokaryote)
E-SUCR	Sucrase (maltase) (yeast)
E-SUCRBG	Sucrase plus β-Galactosidase
E-TMPK	Rec Thymidylate kinase (prokaryote)
E-TREH	Rec Trehalase (prokaryote)
E-UAO	Rec Uricase (eukaryote)
E-XANLB	Rec Xanthan lyase (*Bacillus sp.*)
E-XYTR1	*endo*-1,4-β-Xylanase M1 (*T. viride*)
E-XYTR3	*endo*-1,4-β-Xylanase M3 (*T. longibrachiatum*; pI 9.0)
E-XYAN4	*endo*-1,4-β-Xylanase M4 (*A. niger*)
E-XYRU6	*endo*-1,4-β-Xylanase M6 (rumen microorganism)
E-XYNAP	Rec *endo*-1,4-β-Xylanase (*A. punctata*)
E-XYNBS	Rec *endo*-1,4-β-Xylanase (*B. stearothermophilus T6*)
E-XYNACJ	Rec *endo*-1,4-β-Xylanase (*C. japonicus*)
E-XYNBCM	Rec *endo*-1,4-β-Xylanase (*C. mixtus*)
E-XYLNP	Rec *endo*-1,4-β-Xylanase (*N. patriciarum*)
E-XGP74	Rec *endo*-1,4-β-Glucanase (*Paenibacillus sp.*)
E-XYLATM	Rec *endo*-1,4-β-Xylanase (*T. maritima*)
E-XEGP	Rec Xyloglucanase (*Paenibacillus sp.*)
E-BXSEBP	Rec *exo-1,4*-β-Xylosidase (*B. pumilus*)
E-BXSR	Rec *exo-1,4*-β-Xylosidase (*S. ruminantium*; regular)

Rec (recombinant enzyme)

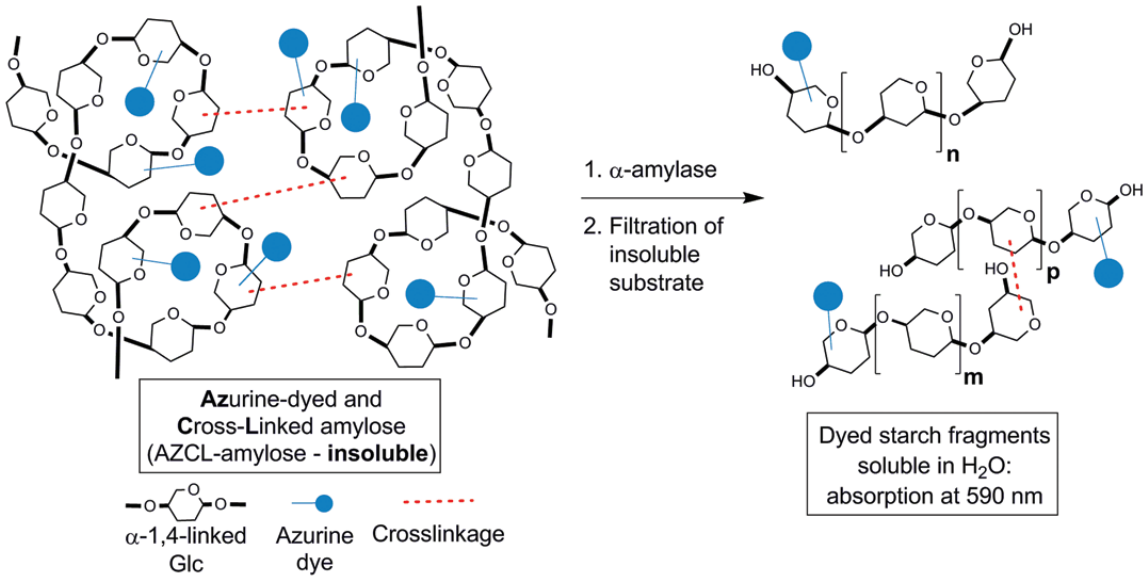
ENZYME SUBSTRATES...

ENZYME SUBSTRATES

CHROMOGENIC SUBSTRATES

Chromogenic, or dye-labelled polysaccharides are useful for the specific measurement of polysaccharide *endo*-hydrolases in crude plant extracts or industrial enzyme preparations. Traditionally, such enzymes have been measured using the native polysaccharide, followed by quantification of the increase in reducing sugar or decrease in viscosity on hydrolysis. Since a range of enzymes, including *endo*- and *exo*-polysaccharidases and glycosidases, act on any given polysaccharide, reducing-sugar methods are not specific. Viscosity reduction methods are specific for *endo*-hydrolase activity, but are tedious to perform, and require specialist equipment. Chromogenic polysaccharide substrates offer the advantages of being specific and sensitive, and can form the basis of accurate, reliable and robust assay procedures.

In the case of insoluble chromogenic substrates the insoluble substrate (gelatinous particles) is depolymerised and solubilised by the action of the *endo*-hydrolase. The reaction is terminated by adding an alkaline solution to stop enzyme activity and the reaction slurry is filtered or centrifuged. Colour in the filtrate or supernatant is measured in a spectrophotometer and the colour intensity is directly related to enzyme activity. Shown below is a schematic representation of the use of AZCL-amylose (Cat. No. I-AZAMY) to measure α-amylase activity in a sample.



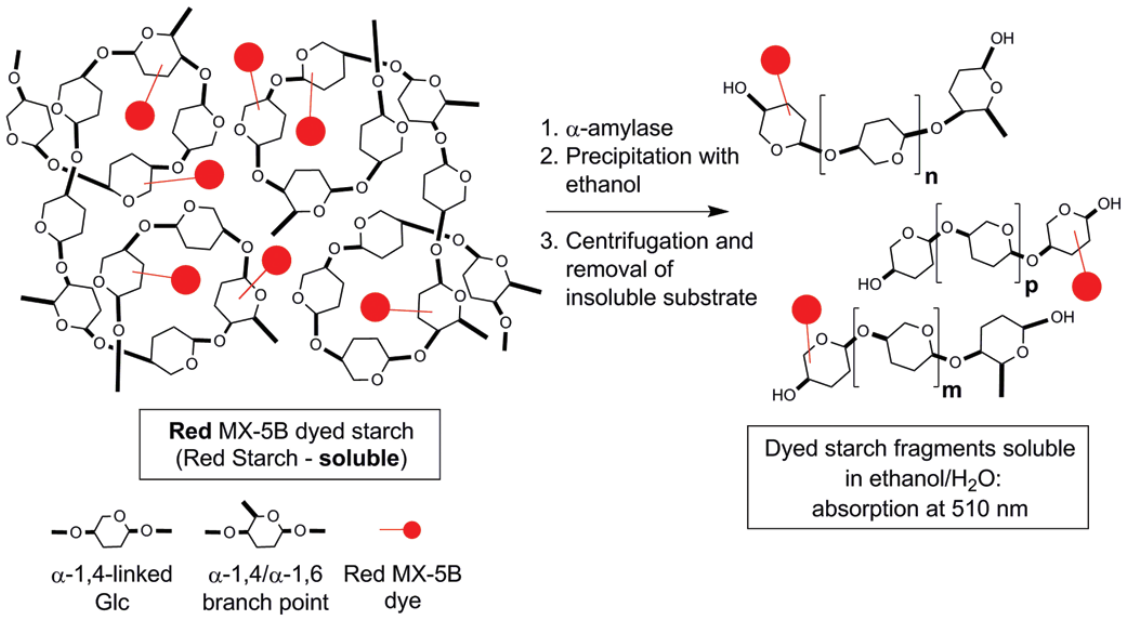
INSOLUBLE (CROSSLINKED) CHROMOGENIC SUBSTRATES

Cat. No.	Product	For the Measurement of	Recommended Conditions
I-AZAMY	AZCL-Amylose	α-Amylase (Fungal)	Na acetate, 100 mM, pH 4.4
		α-Amylase (Cereal)	Na maleate, 100 mM, pH 6.0
		α-Amylase (Bacterial)	Bis-Tris, 100 mM, pH 7.0
I-AZDAR	AZCL-Arabinan (debranched)	*endo*-Arabinanase	Na acetate, 50 mM, pH 4.0
I-AZCEL	AZCL-HE-Cellulose	*endo*-Cellulase (*Trichoderma*)	Na acetate, 25 mM, pH 4.5
I-AZXYG	AZCL-Xyloglucan (tamarind)	*endo*-Cellulase (*Aspergillus*)	Na acetate, 25 mM, pH 4.5
I-ACELL	Azo-α-Cellulose		
I-AAVIC	Azo-Avicel		
I-AZBGL	AZCL-Barley β-Glucan	*endo*-Cellulase (*Trichoderma*)	Na acetate, 25 mM, pH 4.5
		Lichenase	Na phosphate, 25 mM, pH 6.5
		Malt β-Glucanase	Na acetate, 25 mM, pH 4.5
I-AZPAC	AZCL-Pachyman	*endo*-1,3-β-Glucanase	Na acetate, 50 mM, pH 6.0
I-AZCUR	AZCL-Curdlan		

Cat. No.	Product	For the Measurement of	Recommended Conditions
I-AZCHAN	AZCL-Chitosan	*endo*-Chitosanase	Na acetate, 50 mM, pH 5.0
I-AZDEX	AZCL-Dextran (No. B-512)	*endo*-1,6-α-Dextranase	Na acetate, 50 mM, pH 5.0
I-AZGLP	AZCL-Galactan (potato)	*endo*-1,4-β-Galactanase	Na acetate, 25 mM, pH 4.3
I-AZGMA	AZCL-Galactomannan (carob)	*endo*-1,4-β-Mannanase	Na acetate, 50 mM, pH 4.5
I-AZCAS	AZCL-Casein	*endo*-Protease	Na phosphate, 100 mM, pH 7.0
I-AZCOL	AZCL-Collagen		
I-AZPUL	AZCL-Pullulan	Microbial pullulanase	Na acetate, 100 mM, pH 5.0
		Malt limit-dextrinase	Na maleate, 100 mM, pH 5.5
I-AZRHI	AZCL-Rhamnogalacturonan I	Rhamnogalacturonanase	Na acetate, 50 mM, pH 4.5 (or 8)
I-AZXBW	AZCL-Xylan (birchwood)	*endo*-Xylanase	Na acetate, 25 mM, pH 4.7
I-AZXBE	AZCL-Xylan (beechwood)[NEW]		
I-AZWAX	AZCL-Arabinoxylan (wheat)		

SOLUBLE CHROMOGENIC SUBSTRATES

In the case of soluble chromogenic substrates, an enzyme sample is incubated with the soluble substrate. The reaction is terminated and high molecular weight, partially hydrolysed fragments are precipitated from solution with an organic solvent such as ethanol or methoxyethanol. Lower molecular weight fragments (products of enzymatic hydrolytic activity) remain in solution. The suspension is mixed thoroughly, centrifuged, and the colour in the supernatant solution is measured in a spectrophotometer. With the aid of a standard curve, the enzyme activity can be determined. Shown below is a schematic representation of the use of Red Starch (Cat. No. S-RSTAR) to measure α-amylase activity in a sample.



SOLUBLE CHROMOGENIC SUBSTRATES

Cat. No.	Product	For the Measurement of	Recommended Conditions	Precipitant Solution
S-RDAR	Red Debranched Arabinan (sugar beet)	*endo*-Arabinanase	Na acetate, 200 mM, pH 4.5	95% v/v Ethanol
S-RSTAR	Red Starch	α-Amylase (Fungal)	Na malate, 100 mM, pH 5.4	95% v/v Ethanol
		α-Amylase (Cereal)	Na malate, 100 mM, pH 5.4	
		α-Amylase (Bacterial)	Na maleate, 100 mM, pH 6.5	
S-ACMCL	Azo-CM-Cellulose (liquid)	*endo*-Cellulase	Na acetate, 100 mM, pH 4.5	80% v/v Ethanol/ Na Acetate, Zn Acetate, pH 5
S-ACMC	Azo-CM-Cellulose (powder)			
S-AZXG	Azo-Xyloglucan (tamarind)	*endo*-Cellulase	Na acetate, 100 mM, pH 4.5	95% v/v Ethanol
S-ABG100	Azo-Barley Glucan	*endo*-Cellulase Lichenase Malt β-Glucanase	Na acetate and Na phosphate 40 mM, pH 4.6	80% v/v Methoxyethanol/ Na Acetate, Zn Acetate, pH 5
S-AZFR5	Azo-Fructan	*endo*-Fructanase	Na acetate, 100 mM, pH 4.5	86% Ethanol/ KOH, 200 mM
S-AZFRXOI	Azo-Fructan plus *exo*-Inulinase			
S-RPUL	Red Pullulan	Microbial pullulanase	Na acetate, 200 mM, pH 5.0	95% v/v Ethanol
		Malt limit-dextrinase	Na acetate, 200 mM, pH 5.0	
S-ACGLM	Azo-Carob Galactomannan	*endo*-1,4-β-Mannanase	Na acetate, 200 mM, pH 4.0	95% v/v Ethanol
S-AGALP	Azo-Galactan (potato)			
S-AZCAS	Azo-Casein (Sulphanilamide Dyed)	*endo*-Protease	Na phosphate, 100 mM, pH 7.0	5% Trichloroacetic acid
S-AZRH	AZ-Rhamnogalacturonan	Rhamnogalacturonanase	Na acetate, 100 mM, pH 4.5	95% v/v Ethanol
S-AWAXL	Azo-Wheat Arabinoxylan (liquid)	*endo*-Xylanase	Na acetate, 50 mM, pH 4.5	95% v/v Ethanol
S-AWAXP	Azo-Wheat Arabinoxylan (powder)			
S-AXBL	Azo-Xylan (birchwood) (liquid)			
S-AXBP	Azo-Xylan (birchwood) (powder)			

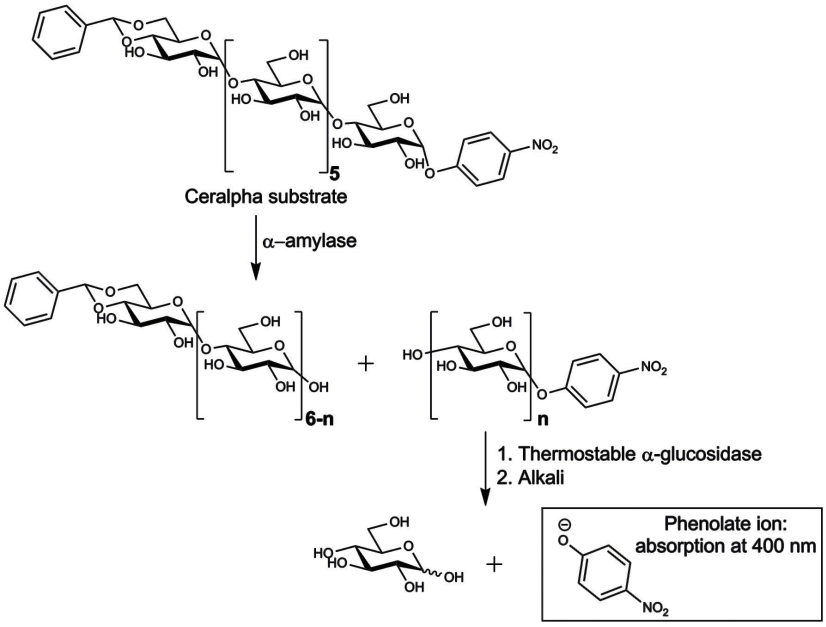
ENZYME TABLET TESTS

Megazyme supplies a range of enzyme tablet tests for ultimate end-user convenience. These products contain the insoluble chromogenic substrates discussed above and from a procedural perspective, operate in the same way. The advantage of enzyme tablet tests is that the need to accurately weigh substrate quantities (and the error associated with this parameter) is removed.
Most enzyme tablet test products are available in packsizes of 200 and 1000 tablets. They are listed below, separated in terms of the enzyme activities that can be assayed along with the suggested buffer conditions for each test.

Cat. No.	Product	For the Measurement of	Recommended Conditions
T-AMZ	Amylazyme	α-Amylase (Fungal)	Na acetate, 100 mM, pH 4.4
T-AMZBG	Amylazyme BG	α-Amylase (Cereal)	Na maleate, 100 mM, pH 6.0
T-AMZRD	Amylazyme Red	α-Amylase (Bacterial)	Bis-Tris, 100 mM, pH 7.0
T-AMZHY	Amylazyme HY[NEW]		
T-ARZ	Arabinazyme	Arabinase	Na acetate, 50 mM, pH 4.0
T-CAF	Cellazyme AF[NEW]		
T-CCZ	Cellazyme C	*endo*-Cellulase	Na acetate, 25 mM, pH 4.5
T-CTZ	Cellazyme T		
T-BGZ	Beta-Glucazyme	*endo*-Cellulase	Na acetate, 25 mM, pH 4.5
		Lichenase	Na phosphate, 25 mM, pH 6.5
		Malt ß-Glucanase	Na acetate, 25 mM, pH 4.5
T-PAZ	1,3-Beta-Glucazyme	*endo*-1,3-ß-Glucanase	Na acetate, 50 mM, pH 6.0
T-CUR	1,3-Beta-Glucazyme HS[NEW]		
T-CHZ	Chitozyme	Chitosanase	Na acetate, 50 mM, pH 5.0
T-DEXT	Alpha-Dextrazyme	*endo*-1,6-α-Dextranase	Na acetate, 50 mM, pH 5.0
T-LDZ	Limit-Dextrizyme	Microbial pullulanase	Na acetate, 100 mM, pH 5.0
		Malt limit-dextrinase	Na maleate, 100 mM, pH 5.5
T-GLZ	Galactazyme	*endo*-1,4-ß-Galactanase	Na acetate, 25 mM, pH 4.3
T-MNZ	Mannazyme	*endo*-1,4-ß-Mannanase	Na acetate, 50 mM, pH 4.5
T-PRAK	Protazyme AK	*endo*-Protease	Na phosphate, 100 mM, pH 7.0
T-PROL	Protazyme OL		
T-RHAM	Rhamnozyme	Rhamnogalacturonanase	Na acetate, 50 mM, pH 4.5 (or 8)
T-XYZ	Xylazyme	*endo*-Xylanase	Na acetate, 25 mM, pH 4.7
T-XAF	Xylazyme AF[NEW]		
T-XAX	Xylazyme AX		

COLOURIMETRIC OLIGOSACCHARIDES

The colourimetric substrates supplied by Megazyme are based on defined oligosaccharides which are covalently linked to a colourimetric or fluorimetric moiety through the reducing D-glucosyl residue of the oligosaccharide. In the measurement of α-amylase using Ceralpha reagent, the substrate is composed of end-blocked 4-nitrophenyl-α-maltoheptaoside in the presence of an excess quantity of thermostable α-glucosidase. When the substrate is cleaved by α-amylase, the α-glucosidase removes the remaining D-glucosyl residues releasing free 4-nitrophenol, which in the presence of an alkaline solution is converted to the yellow phenolate ion. The principle is depicted below.



Colourimetric oligosaccharides that do not contain a blocking group (e.g. 2-chloro-4-nitrophenol-cello-oligosaccharides) cannot be used to measure *endo*-acting hydrolytic in the presence of *exo*-acting enzymes but can be employed for the assay of pure enzymes. These substrates also find use in enzyme research employing HPLC analysis where their chromogenic moiety allows for quantification by UV detection.

Cat. No.		Product
2-Chloro-4-Nitrophenyl-Cello-Oligosaccharides		
O-CPNPG2	DP2	2-Chloro-4-nitrophenyl-β-cellobioside[NEW]
O-CPNPG3	DP3	2-Chloro-4-nitrophenyl-β-cellotrioside[NEW]
O-CPNPG4	DP4	2-Chloro-4-nitrophenyl-β-cellotetraoside[NEW]
O-CPNPG5	DP5	2-Chloro-4-nitrophenyl-β-cellopentaoside[NEW]
4-Methylumbelliferyl-β-Cello-Oligosaccharides		
O-4MUG2	DP2	4-Methylumbelliferyl-β-cellobioside[NEW]
O-4MUG3	DP3	4-Methylumbelliferyl-β-cellotrioside[NEW]
O-4MUG4	DP4	4-Methylumbelliferyl-β-cellotetraoside[NEW]
O-4MUG5	DP5	4-Methylumbelliferyl-β-cellopentaoside[NEW]
O-B4MUG3		Blocked 4-methylumbelliferyl-β-cellotrioside[NEW]
O-BNAPG3		Blocked β-naphthyl-β-cellotrioside[NEW]

Cat. No.		Product
4-Nitrophenyl-β-Xylo-Oligosaccharides		
O-PNPX2	DP2	4-Nitrophenyl-β-xylobioside[NEW]
O-PNPX3	DP3	4-Nitrophenyl-β-xylotrioside[NEW]
O-ONPX2	DP2	2-Nitrophenyl-β-xylobioside[NEW]
4-Methylumbelliferyl-β-Xylo-Oligosaccharides		
O-4MUX2	DP2	4-Methylumbelliferyl-β-xylobioside[NEW]
O-4MUX3	DP3	4-Methylumbelliferyl-β-xylotrioside[NEW]
2-Chloro-4-Nitrophenyl-α-Manno Oligosaccharides		
O-CPNPAM2	DP2	2-Chloro-4-nitrophenyl-α-mannobioside[NEW]
O-CPNPAM3	DP3	2-Chloro-4-nitrophenyl-α-mannotrioside[NEW]
O-CPNPAM4	DP4	2-Chloro-4-nitrophenyl-α-mannotetraoside[NEW]
4-Methylumbelliferyl-α-Manno-Oligosaccharides		
O-4MUAM2	DP2	4-Methylumbelliferyl-α-mannobioside[NEW]
O-4MUAM3	DP3	4-Methylumbelliferyl-α-mannotrioside[NEW]
O-4MUAM4	DP4	4-Methylumbelliferyl-α-mannotetraoside[NEW]
Nitrophenyl-Malto-Oligosaccharides		
O-BPNPC7		Blocked 4-nitrophenyl-α-maltoheptaoside
O-PNPC3		4-Nitrophenyl-β-maltotrioside[NEW]
O-NAPC3		β-Naphthyl-β-maltotrioside[NEW]
O-PNPL		4-Nitrophenyl β-lactoside[NEW]

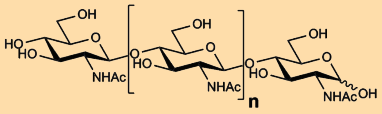
CARBOHYDRATES...

CARBOHYDRATES

Megazyme provides high purity oligosaccharides and polysaccharides for research purposes. Although in many cases the measurement of enzymatic activity is greatly simplified through the use of chromogenic / colourimetric substrates, activity on the native substrates can also be investigated. Megazyme's oligosaccharides and polysaccharides are also used all over the world for investigations into the mechanism of action of enzymes. The common oligosaccharide families (cello-, xylo-, manno- etc.) are generally available in DP2-6 and are accompanied by a data sheet describing purity by HPLC/TLC as appropriate. The most common polysaccharides are available in a range of viscosity grades that vary in average molecular weight, degree of branching on the polysaccharide backbone, or both. Accompanying data sheets outline relevant physicochemical data.

OLIGOSACCHARIDES

Acetyl-Chito-Oligosaccharides

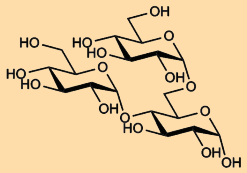


Cat. No.		Product
O-CHI2	DP2	Diacetyl-chitobiose
O-CHI3	DP3	Triacetyl-chitotriose
O-CHI4	DP4	Tetraacetyl-chitotetraose
O-CHI5	DP5	Pentaacetyl-chitopentaose
O-CHI6	DP6	Hexaacetyl-chitohexaose

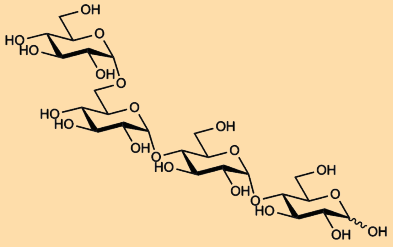
Aldouronic Acids (from xylan)

O-AMX	Aldouronic acid mixture
O-AMXR	Aldouronic acid mixture (borohydride reduced)

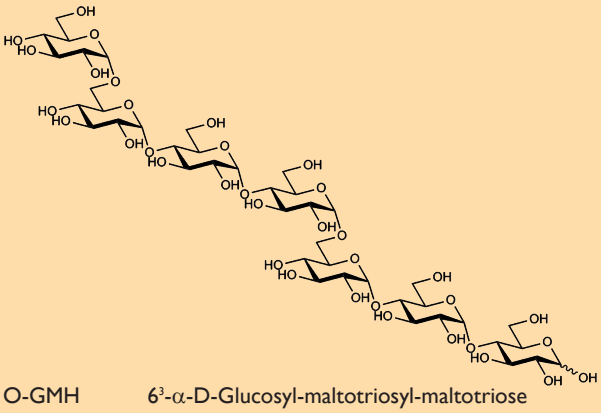
Amylosaccharides (mixed-linkage)



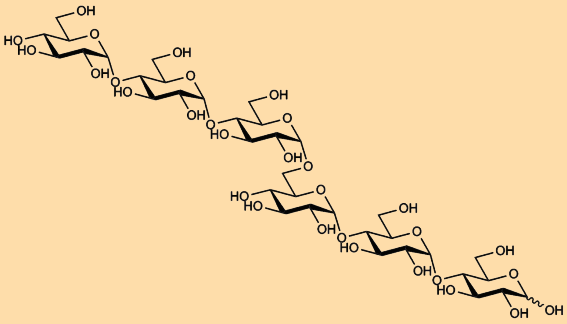
O-IPAN Isopanose[NEW]



O-GMT 6^3-α-D-Glucosyl-maltotriose



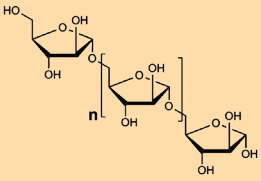
O-GMH 6^3-α-D-Glucosyl-maltotriosyl-maltotriose



O-MTMT 6^3-α-D-maltotriosyl-maltotriose

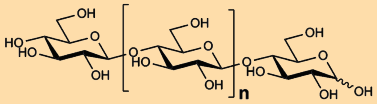
O-MTMTRD 6^3-α-D-maltotriosyl-maltotriose (BH_4 reduced)[NEW]

1,5-α-L-Arabino-Oligosaccharides



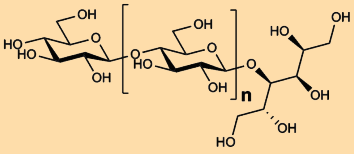
Cat. No.		Product
O-ABI	DP2	Arabinobiose (syrup)
O-ATR	DP3	Arabinotriose (syrup)
O-ATE	DP4	Arabinotetraose (syrup)
O-APE	DP5	Arabinopentaose (syrup)
O-AHE	DP6	Arabinohexaose (powder)
O-AHP	DP7	Arabinoheptaose (powder)
O-AOC	DP8	Arabino-octaose (powder)

Cello-Oligosaccharides



Cat. No.		Product
O-CTR	DP3	Cellotriose
O-CTE	DP4	Cellotetraose
O-CPE	DP5	Cellopentaose
O-CHE	DP6	Cellohexaose

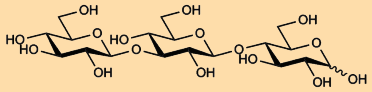
Borohydride Reduced Cello-Oligosaccharides



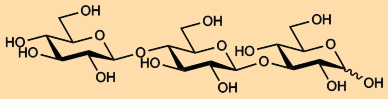
Cat. No.		Product
O-CTRRD	DP3	1,4-β-D-Cellotriitol[NEW]
O-CTERD	DP4	1,4-β-D-Cellotetraitol[NEW]
O-CPERD	DP5	1,4-β-D-Cellopentaitol[NEW]
O-CHERD	DP6	1,4-β-D-Cellohexaitol[NEW]

Cat. No.	Product

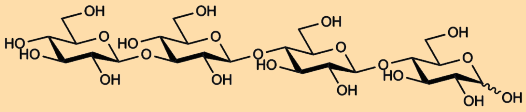
1,3:1,4 β-Gluco-Oligosaccharides



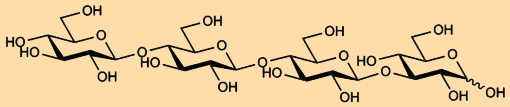
O-BGTRIA 1,3:1,4-β-Glucotriose A



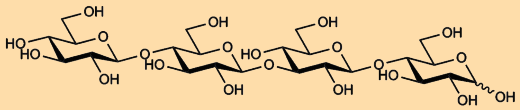
O-BGTRIB 1,3:1,4-β-Glucotriose B



O-BGTETA 1,3:1,4-β-Glucotetraose A

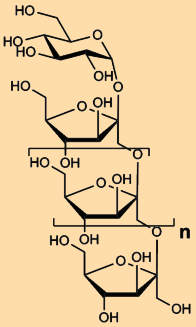


O-BGTETB 1,3:1,4-β-Glucotetraose B



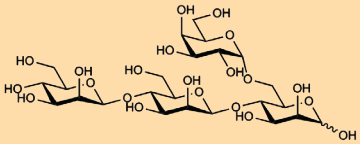
O-BGTETC 1,3:1,4-β-Glucotetraose C

Fructo-Oligosaccharides



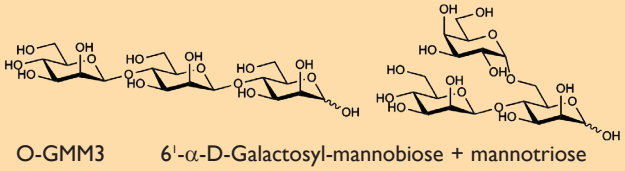
O-KTR	DP3	1-Kestose
O-KTE	DP4	1,1-Kestotetraose
O-KPE	DP5	1,1,1-Kestopentaose

Galacto-Manno-Oligosaccharides

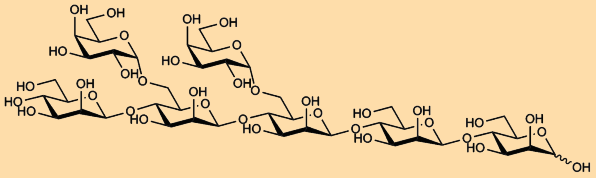


O-GM3 6¹-α-D-Galactosyl-mannotriose

Cat. No.	Product

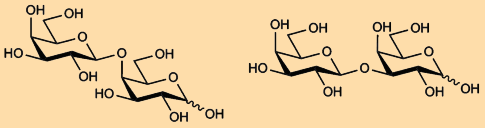


O-GMM3 6¹-α-D-Galactosyl-mannobiose + mannotriose



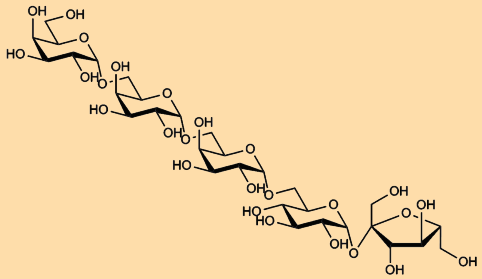
O-GGM5 6³,6⁴-α-D-Galactosyl-mannopentaose

Galacto-Oligosaccharides



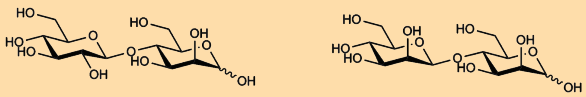
O-GBI 1,3(4)-β-D-Galactobiose (purity > 95%)

Galactosyl-Sucrose Oligosaccharides

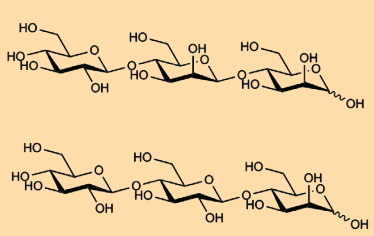


O-VER Verbascose

Gluco-Manno-Oligosaccharides



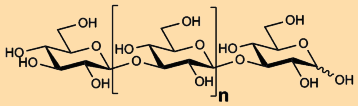
O-GMMBI 1,4-β-D-Glucosyl-D-Mannose plus 1,4-β-D-Mannobiose[NEW]



O-GMMTR 1,4-β-D-Glucosyl-D-Mannobiose and 1,4-β-D-Cellobiosyl-D-Mannose[NEW]

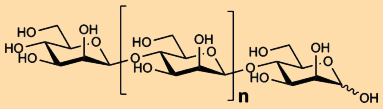
Cat. No.	Product

1,3-β-D-Gluco-Oligosaccharides



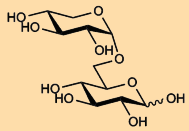
O-LAM2	DP2	Laminaribiose
O-LAM3	DP3	Laminaritriose
O-LAM4	DP4	Laminaritetraose
O-LAM5	DP5	Laminaripentaose
O-LAM6	DP6	Laminarihexaose

1,4-β-D-Manno-Oligosaccharides

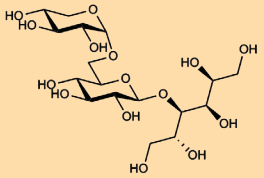


O-MBI	DP2	Mannobiose
O-MTR	DP3	Mannotriose
O-MTE	DP4	Mannotetraose
O-MPE	DP5	Mannopentaose
O-MHE	DP6	Mannohexaose

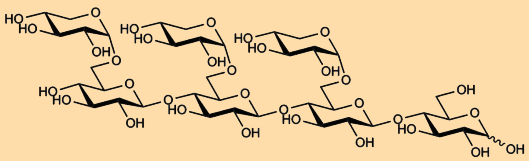
Xyloglucan Derived Oligosaccharides



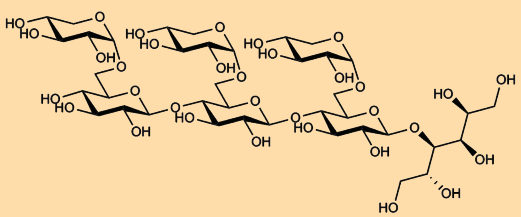
O-IPRM Isoprimeverose (xyloglucan derived)



O-XCBIR Xylosyl-cellobiose ($NaBH_4$ reduced)



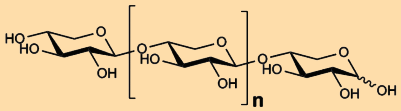
O-X3G4 Xyloglucan heptasaccharide (X_3Glc_4)



O-X3G4R Heptasaccharide (X_3Glc_4; $NaBH_4$ reduced)
O-XGHON Xyloglucan (Hepta + octa + nona-saccharides)
O-XGHDP Higher DP xyloglucan oligosaccharides

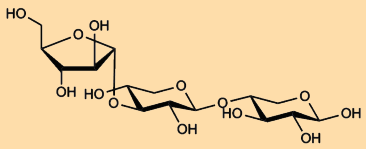
Cat. No.	Product

1,4-β-D-Xylo-Oligosaccharides

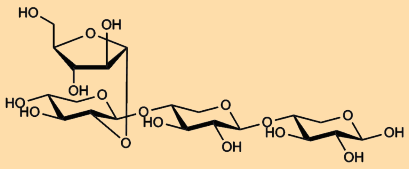


O-XBI	DP2	Xylobiose
O-XTR	DP3	Xylotriose
O-XTE	DP4	Xylotetraose
O-XPE	DP5	Xylopentaose
O-XHE	DP6	Xylohexaose
O-XBIRD	DP2	Xylobiose (borohydride reduced)[NEW]
O-XTRRD	DP3	Xylotriose (borohydride reduced)[NEW]

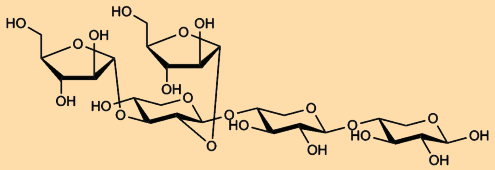
Arabino-Xylo-Oligosaccharides



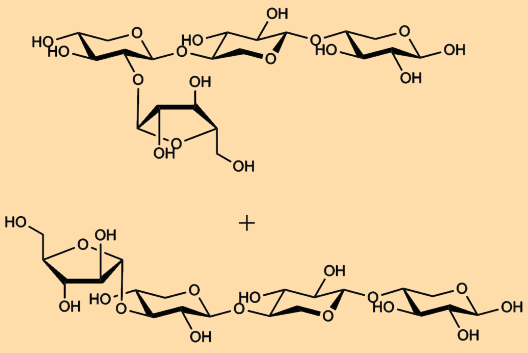
O-AX2 3^2-α-L-Arabinofuranosyl-xylobiose[NEW]



O-AX3 2^3-α-L-Arabinofuranosyl-xylotriose[NEW]



O-A2X3 2^3-,3^3-di-α-L-Arabinofuranosyl-xylotriose[NEW]



O-AX3MIX 2^3-α-L-Arabinofuranosyl-xylotriose[NEW]
plus 3^3-α-L-Arabinofuranosyl-xylotriose

POLYSACCHARIDES

Cat. No.	Product
P-ARAB	Arabinan (sugar beet)
P-DBAR	Debranched Arabinan (sugar beet)
P-LARB	Linear 1,5-α-L-Arabinan (sugar beet)
P-CMLA	CM-Linear 1,5-α-L-Arabinan (sugar beet)
P-ARGAL	Arabinogalactan (larch wood)
P-RAXY	Arabinoxylan (rye flour)
P-WAXYL	Arabinoxylan (wheat flour; low viscosity)
P-WAXYM	Arabinoxylan (wheat flour; medium viscosity)
P-WAXYH	Arabinoxylan (wheat flour; high viscosity)
P-WAXYI	Arabinoxylan (wheat flour; insoluble)
P-ADWAX22	Arabinoxylan (acid debranched; 22% ara)NEW
P-ADWAX26	Arabinoxylan (acid debranched; 26% ara)NEW
P-EDWAX30	Arabinoxylan (enzyme debranched; 30% ara)NEW
P-BGBL	Beta-Glucan (barley; low viscosity)
P-BGBM	Beta-Glucan (barley; medium viscosity)
P-BGBH	Beta-Glucan (barley; high viscosity)
P-BGOM	Beta-Glucan (oat; medium viscosity)
P-BGOH	Beta-Glucan (oat; high viscosity)
P-BGYST	Beta Glucan (yeast; alkali soluble)
P-BGCFA	Beta-Glucan CFA standard
P-MWBGS	Beta-Glucan MW standard
P-BLDX	Beta-Limit Dextrin (10 g)
P-BLDX50	Beta-Limit Dextrin (50 g)
P-CMC4M	Carboxymethyl Cellulose 4M
P-CHITIN	Chitin (colloidal)NEW
P-CHITOSAN	ChitosanNEW
P-CURDL	Curdlan
P-CMCUR	CM-Curdlan

Cat. No.	Product
P-FOS28	Fructooligosaccharides (DP2-8)NEW
P-GALLU	Galactan (lupin)
P-GALPOT	Galactan (potato)
P-GALML	Galactomannan (carob; low viscosity)
P-GALMH	Galactomannan (carob; high viscosity)
P-GGMMV	Galactomannan (guar; medium viscosity)
P-GGMHV	Galactomannan (guar; high viscosity)
P-GGM21	Galactomannan (guar; galactose depleted; 21% gal)
P-GGM28	Galactomannan (guar; galactose depleted; 28% gal)
P-GLCML	Glucomannan (konjac; low viscosity)
P-GLCMH	Glucomannan (konjac; high viscosity)
P-INUL	Inulin (DP2-60)NEW
P-LICHN	Lichenan (icelandic moss)
P-MANIV	Mannan (ivory nut)
P-MANCB	Mannan (1,4-β-D-mannan)
P-PACHY	Pachyman (1,3-β-D-glucan)
P-CMPAC	CM-Pachyman
P-PGALU	Pectic Galactan (lupin)
P-PGAPT	Pectic Galactan (potato)
P-PGACT	Polygalacturonic Acid (PGA)
P-PULLN	Pullulan
P-PULLBH	Pullulan ($NaBH_4$ reduced)
P-RHAM1	Rhamnogalacturonan I (potato)
P-RHAGN	Rhamnogalacturonan (soy bean)
P-SCLER	ScleroglucanNEW
P-XYGLN	Xyloglucan (tamarind)
P-XYLNBE	Xylan (Beechwood; purified)NEW

EQUIPMENT...

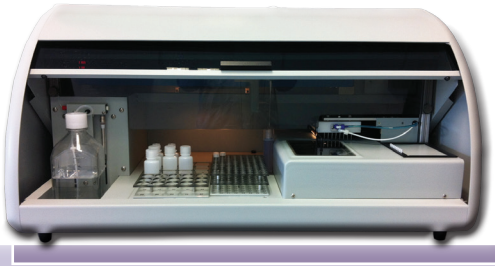
EQUIPMENT

Megazyme provides a number of equipment items for use with its diagnostic applications. The wine industry in particular is well catered for with a range of spectrophotometers, from the Megaquant™ Meter which is suitable for any home brewer right up to the fully automated Chemwell® 2910 which is sufficient for a large winery or wine analysis laboratory.

Cat. No. D-CHEM2910

- Suitable for large wineries / laboratories
- Automated assay formats (200 tests per hour)
- Pre-programmed with Megazyme test settings
- Full range of tests available
- Simple assay procedures

ChemWell®2910



Cat. No. D-CHEMT

- Suitable for medium wineries / laboratories
- Automated assay formats (100 tests per hour)
- Pre-programmed with Megazyme test settings
- Full range of tests available
- Simple assay procedures

ChemWell®-T

Cat. No. D-STATFAX

- Suitable for small wineries / laboratories
- Manual assay formats
- Pre-programmed with Megazyme test settings
- Full range of tests available
- Simplified data analysis
- Reagent stability > 2 years

Stat Fax® 4500

Cat. No. D-FRGLMQ or D-LMALMQ

- Small and portable
- Simple to use
- Compatible with K-FRGLMQ and K-LMALMQ
- Extremely affordable

Megaquant™

Cat. No.	Product
	EQUIPMENT
D-CHEM2910	ChemWell®2910 Automated EIA & Chemistry Analyser NEW
D-CHEMT	ChemWell®-T Automated Chemistry Analyser NEW
D-STATFAX	Stat Fax® 4500 Chemistry Analyser (Spectrophotometer) NEW
D-SFTUBE	Tubes for Stat Fax® 4500 Chemistry Analyser NEW
D-FRGLMQ	*MegaQuant*™ Meter plus D-Fructose & D-Glucose Reagents
D-LMALMQ	*MegaQuant*™ Meter plus L-Malic Acid Reagents
D-MQTUB	Tubes for *MegaQuant*™ Meter (24 tubes)
D-IBMKIII	Megazyme Incubation Bath MK III
D-INTDFB	Water Bath for Integrated Total Dietary Fibre Procedure NEW
	BOOK
D-ADFTB	Advanced Dietary Fibre Technology Book
	GENERAL CHEMICALS
G-AMBOH	Amberlite FPA OH^- Ion Exchange Resin
G-AMBH	Ambersep 200 H^+ Ion Exchange Resin
G-CELITE	Celite
G-LCYST200	L-Cysteine Hydrochloride Monohydrate

Cat. No.	Product
	COFACTORS & STAINS
C-ATP	Adenosine 5'-triphosphate
C-CLFR	Calcofluor fluorescent stain
C-COA500	Coenzyme A (trilithium salt)
C-NAD	β-Nicotinamide adenine di-nucleotide
C-NADP	β-Nicotinamide adenine di-nucleotide phosphate
C-NADH	β-Nicotinamide adenine di-nucleotide reduced salt
	BUFFERS
B-BISTRIS250	BIS-TRIS Buffer Salt
B-CAPS200	CAPS Buffer Salt
B-CAPSO250	CAPSO Buffer Salt
B-GLYGLY250	Glycylglycine Buffer Salt
B-HEPES250	HEPES Buffer Salt
B-MES250	MES Monohydrate Buffer Salt
B-MOPS250	MOPS Buffer Salt
B-PIPES250	PIPES Buffer Salt
B-TRIS500	TRIS Buffer Salt
	LECTINS
L-CONA	Concanavalin A

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Lisa McCleary


100
50
1000 ml
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Retention Time Standard
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Megazyme
INTEGRATED TDF KIT
D-Sorbitol (dry)
~ 12 g
Megazyme
NTEGRATED TDF
Protease
Store at 4°C or -20°C
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