

Enzymatic Analysis for Food and Feed

Enzymatic tests are widely used as analytical tools for the analysis of food products such as fruit juices, wine or beer, dairy products, eggs and meat. Enzymatic test kits allow to determine sugars, acids, alcohols and a few other food components.

They are based on high quality enzymes, enabling precise and specific measurements of each compound, even in complex matrices. Results are measured with a spectrophotometer and automation is possible.

Numerous enzymatic methods have been approved or validated by international organisations.

The “**Yellow line**” kits are produced by Roche (previously Boehringer Mannheim), with more than 30 years of experience in the production of the enzymes, which are the key element of each test. The Roche test kits have been used and validated worldwide for several decades, with many corresponding publications. They have been selected as reference method by the international organizations mentioned above, and they are still the reference quality today.

As an alternative, R-Biopharm also offers the **Enzytec™ Generic** line.

The **Enzytec™ Color** line is a new product range for colorimetric assays that are used in wine analysis (e.g. iron, SO₂, tartaric acid). They are based on a chemical reaction with a chromogen in the visible range, without using any enzyme.

Enzytec™ Fluid kits are produced by Thermo Scientific, a reputable company in the field of automation. These reagents are all liquid and ready-to-use, so they can be placed directly on any biochemistry analyser and stay on board for true random-access capability.

The new product line **RIDA®CUBE** enables single testing. The test cartridges are ready-to-use and allow a rapid analysis. The **RIDA®CUBE** kits can only be used in combination with the **RIDA®CUBE SCAN** instrument.



Roche "Yellow Line"



Enzytec™ Fluid



RIDA®CUBE SCAN

Advantages

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| <ul style="list-style-type: none"> • Reference quality for more than 30 years • 31 tests for all requirements in the food industry • Produced by Roche Diagnostics | <ul style="list-style-type: none"> • Liquid, ready-to-use reagents • Stable until end of shelf-life, even after opening • Easy and safe use on biochemistry analysers | <ul style="list-style-type: none"> • Small but precise like a big biochemistry analyser • Ready-to-use test cartridges for single testing • Only one pipeting step and the result after 15 min |
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"Yellow Line" Roche Diagnostics

Product	Description	No. of Tests/Amount	Art. No.
Yellow Line Roche Diagnostics – Acids			
Acetic Acid	Enzymatic test (340 nm)	3 x 11 determinations	10148261035
L-Ascorbic Acid	Enzymatic test (578 nm)	21 determinations	10409677035
Citric Acid	Enzymatic test (340 nm)	3 x 12 determinations	10139076035
Formic Acid	Enzymatic test (340 nm)	21 determinations	10979732035
D-Gluconic Acid	Enzymatic test (340 nm)	27 determinations	10428191035
L-Glutamic Acid	Enzymatic test (492 nm)	3 x 13 determinations	10139092035
D-3-Hydroxybutyric Acid	Enzymatic test (492 nm)	3 x 12 determinations	10907979035
D-Isocitric Acid	Enzymatic test (340 nm)	33 determinations	10414433035
D-/L-Lactic Acid	Enzymatic test (340 nm)	30 determinations of each	11112821035
L-Lactic Acid	Enzymatic test (340 nm)	30 determinations	10139084035
D-Malic Acid	Enzymatic test (340 nm)	3 x 11 determinations	11215558035
L-Malic Acid	Enzymatic test (340 nm)	30 determinations	10139068035
Succinic Acid	Enzymatic test (340 nm)	11 determinations	10176281035
Yellow Line Roche Diagnostics – Sugars			
D-Glucose	Enzymatic test (340 nm)	3 x 45 determinations	10716251035
D-Glucose/D-Fructose	Enzymatic test (340 nm)	27 determinations of each	10139106035
Lactose/D-Galactose	Enzymatic test (340 nm)	32 determinations	10176303035
Lactose/D-Glucose	Enzymatic test (340 nm)	32 determinations of each	10986119035
Maltose/Sucrose/ D-Glucose	Enzymatic test (340 nm)	15 determinations of each	11113950035
Raffinose	Enzymatic test (340 nm)	32 determinations	10428167035
Sucrose/D-Glucose	Enzymatic test (340 nm)	22 determinations of each	10139041035
Sucrose/D-Glucose/ D-Fructose	Enzymatic test (340 nm)	22 determinations of each	10716260035
Starch	Enzymatic test (340 nm)	27 determinations	10207748035
Yellow Line Roche Diagnostics – Others			
Acetaldehyde	Enzymatic test (340 nm)	3 x 11 determinations	10668613035
Ammonia	Enzymatic test (340 nm)	50 determinations	11112732035
Urea/Ammonia	Enzymatic test (340 nm)	25 determinations of each	10542946035
Cholesterol	Enzymatic test (405 nm)	31 determinations	10139050035
Ethanol	Enzymatic test (340 nm)	33 determinations	10176290035
Glycerol	Enzymatic test (340 nm)	3 x 11 determinations	10148270035
Nitrate	Enzymatic test (340 nm)	3 x 13 determinations	10905658035
D-Sorbitol/Xylitol	Enzymatic test (492 nm)	3 x 12 determinations	10670057035
Sulfite (SO ₂)	Enzymatic test (340 nm)	31 determinations	10725854035
Yellow Line Roche Diagnostics – Accessories			
Cuvettes Holder		1	10019624035
Plastic Spatulas		500 pcs.	10019623035



Enzymatic Food Analysis

Enzytec™ Color Line

Product	Description	No. of Tests/Amount	Art. No.
Enzytec™ Color Line	Test kits		
Copper	Colorimetric test (580 nm)	2 x 50 ml	E2400
Iron	Colorimetric test (580 nm)	4 x 100 ml	E2300
Tartaric Acid	Colorimetric test (520 nm)	2 x 80 ml	E3100
Total Sulfite	Colorimetric test (340 nm)	2 x 100 ml	E3200
Free Sulfite	Colorimetric test (340 nm)	2 x 100 ml	E3300
GlucaTest®S125	Colorimetric test (550 nm)	125 ml	E3500
GlucaTest®L500		500 ml	E3550

Enzytec™ Fluid Line

Enzytec™ Fluid Line	Acids		
Acetic Acid	Enzymatic test (340 nm)	For automation only	E5226
D-Lactic Acid	Enzymatic test (340 nm)	4 x 10 determinations	E5240
L-Lactic Acid	Enzymatic test (340 nm)	4 x 10 determinations	E5260
L-Malic Acid	Enzymatic test (340 nm)	4 x 10 determinations	E5280
Enzytec™ Fluid Line	Sugars		
D-Fructose	Enzymatic test (340 nm)	4 x 10 determinations	E5120
D-Glucose	Enzymatic test (340 nm)	4 x 10 determinations	E5140
Glucose/Fructose	Enzymatic test (340 nm)	4 x 10 determinations	E5160
Sucrose (via Glucose)	Enzymatic test (340 nm)	4 x 10 determinations	E5180
Enzytec™ Fluid Line	Others		
Ammonia	Enzymatic test (340 nm)	4 x 10 determinations	E5390
Ethanol	Enzymatic test (340 nm)	4 x 10 determinations	E5340
Glycerol	Enzymatic test (340 nm)	4 x 10 determinations	E5360
Enzytec™ Fluid Line	Standards		
Alcohol Standard	Alcohol assay control solution	10 x 1 ml	E5420
Sugar combination Standard	Multi-sugar assay control solution	3 x 3 ml	E5440
Sugar Standard for automation	Multi-sugar calibration solution for automation	3 x 3 ml	E5450



Enzytec™ Generic Line

Product	Description	No. of Tests/Amount	Art. No.
Enzytec™ Generic Line Acids			
Acetic Acid	Enzymatic test (340 nm)	2 x 16 determinations	E1226
L-Ascorbic Acid	Enzymatic test (578 nm)	3 x 8 determinations	E1267
Citric Acid	Enzymatic test (340 nm)	24 determinations	E1214
D-Gluconic Acid	Enzymatic test (340 nm)	32 determinations	E1223
D/L-Lactic Acid	Enzymatic test (340 nm)	32 determinations	E1255
L-Lactic Acid	Enzymatic test (340 nm)	32 determinations	E1254
L-Malic Acid	Enzymatic test (340 nm)	32 determinations	E1215
Oxalic Acid	Enzymatic test (590 nm)	10 determinations	E2100
Sample purifier	Sample preparation for Enzymatic tests	20 samples	E2250
Enzytec™ Generic Line Sugars			
D-Glucose	Enzymatic test (340 nm)	32 determinations	E1210
D-Glucose/D-Fructose	Enzymatic test (340 nm)	32 determinations of each	E1245
Lactose/D-Galactose	Enzymatic test (340 nm)	32 determinations	E1213
Sucrose/D-Glucose	Enzymatic test (340 nm)	16 determinations of each	E1246
Sucrose/D-Glucose/ D-Fructose	Enzymatic test (340 nm)	16 determinations of each	E1247
Starch	Enzymatic test (340 nm)	32 determinations	E1268
Glucose remover	For removal of excess glucose in samples	32	E3400
Enzytec™ Generic Line Standards			
Multi-Acid Standard manual	Multi-acid assay control solution	9 ml	E1240
Multi-Acid Standard for automation	Multi-acid calibration solution for automation	9 ml	E1241
Sugar Standard manual	Multi-sugar assay control solution	9 ml	E1242
Sugar Standard for automation	Multi-sugar calibration solution for automation	9 ml	E1243

RIDA® CUBE (only for RIDA® CUBE SCAN*)

RIDA®CUBE	Ready-to-use cartridges		
Acetic acid	Enzymatic test (340 nm)	32 determinations	RCS4226
Glucose	Enzymatic test (340 nm)	32 determinations	RCS4140
D-Glucose / D-Fructose	Enzymatic test (340 nm)	32 determinations	RCS4160
L-Lactic acid	Enzymatic test (340 nm)	32 determinations	RCS4260
L-Malic acid	Enzymatic test (340 nm)	32 determinations	RCS4280
Sucrose / D-Glucose	Enzymatic test (340 nm)	32 determinations	RCS4180

* See page 54 – • Equipment / Software / Accessories.

Vitamin Analysis in Food, Feed and Pharmaceutical Products

Food products are now being enriched and fortified with vitamins in many forms. But does the amount present in the food at the end of the shelf life match the label on the package?

Food manufacturers, regulatory agencies and commercial laboratories should therefore have analytical methods on hand that allow them to quickly and reliably determine the natural and added vitamin content of food products.

Product testing:

There are different methods for analysing water soluble vitamins: ELISA, immunoaffinity columns (IAC), microbiological and enzymatic microtiter plates. Notice that with the ELISA test system only added vitamins in simple matrices can be analysed. When using immunoaffinity columns in

conjunction with HPLC, the sample is purified and the vitamin is retained by the antibody in the column. Using the vitamin B12 and biotin IAC, you can determine the total vitamin content. With the folic acid IAC you can only determine added folic acid. Depending on the sample preparation the added or total vitamin content can be determined with the microbiological VitaFast® test. With the new enzymatic VitaFast® Vitamin C test in microtiter plate format a determination of total vitamin C content (L-ascorbic acid and L-dehydro-ascorbic acid) is possible.



**VitaFast®
Microbiological Test**

**EASI-EXTRACT®
Immunoaffinity Columns**

**RIDASCREEN®
ELISA**

Advantages

- Samples with an added or natural vitamin content can be analysed
- Method in conformity with official guidelines (Section 64 of the German Food & Feed Act, AOAC)
- AOAC-RI certification for some VitaFast® tests
- Ready-to-use reagents and standards for 96 determinations
- Results available within 24 - 48 hours

- Isolation and concentration of the vitamin
- Pigments and interfering compounds are washed out
- High recovery and low CV's
- Single-Peaks

- Determination of added vitamin
- Use for process control
- Results within 3 hours

Product	Description	No. of Tests/Amount	Art. No.
Microbiological Microtiter Plates			
VitaFast® Folsäure/Folic Acid AOAC-RI 100903	Quantitative determination of the total vitamin content (added and natural) or of the added vitamin only	96 determinations	P1001
VitaFast® Vitamin B12 (Cyanocobalamin) AOAC-RI 101002	Quantitative determination of the total vitamin content (added and natural) or of the added vitamin only	96 determinations	P1002
VitaFast® Vitamin B7 (Biotin) AOAC-RI 101001	Quantitative determination of the total vitamin content (added and natural) or of the added vitamin only	96 determinations	P1003
VitaFast® Vitamin B3 Niacin	Quantitative determination of the total vitamin content (added and natural) or of the added vitamin only	96 determinations	P1004
VitaFast® Pantothensäure/ Pantothenic Acid AOAC-RI 100904	Quantitative determination of the total vitamin content (added and natural) or of the added vitamin only	96 determinations	P1005
VitaFast® Vitamin B1 (Thiamin)	Quantitative determination of the total vitamin content (added and natural) or of the added vitamin only	96 determinations	P1006
VitaFast® Vitamin B2 (Riboflavin) AOAC-RI 100902	Quantitative determination of the total vitamin content (added and natural) or of the added vitamin only	96 determinations	P1007
VitaFast® Vitamin B6 (Pyridoxin)	Quantitative determination of the total vitamin content (added and natural) or of the added vitamin only	96 determinations	P1008
VitaFast® Inositol	Quantitative determination of the total vitamin content (added and natural)	96 determinations	P1009
Enzymatic Microtiter Plate			
VitaFast® Vitamin C (L-Ascorbic Acid)	Quantitative determination of vitamin C (L-ascorbic acid and L-dehydroascorbic acid) possible	50 determinations	P1010
Spiking standards			
VitaFast® Folsäure/Folic Acid Spiking standard	Folic Acid in solid form	3 vials	P3001
VitaFast® Vitamin B12 (Cyanocobalamin) Spiking standard	Cyanocobalamin in solid form	3 vials	P3002
VitaFast® Vitamin B7 (Biotin) Spiking standard	D-Biotin in solid form	3 vials	P3003
VitaFast® Pantothensäure/ Pantothenic Acid Spiking standard	Ca-D-Pantothenat in solid form	3 vials	P3005
Accessories			
VitaFast® Accessory Kit	5 sterile filters PES 0.2 µm, 5 sterile syringes, 5 sterile vials 50 ml, 2 sterile vials 15 ml, 30 sterile vials 1.5 ml	for 5 sample preparations	P2001
Enzyme			
VitaFast® Chicken Pancreatin	Enzyme for sample preparation for determination of natural folic acid	1 vial for 50 sample preparations	P2002

Vitamins

Product	Description	No. of Tests/Amount	Art. No.
Immunoaffinity Columns			
EASI-EXTRACT® VITAMIN B12	Immunoaffinity columns for sample clean-up prior to the analysis of vitamin B12 using HPLC or LC-MS/MS	10 columns (3 ml format) 50 columns (3 ml format)	RBRP80 RBRP80B
EASI-EXTRACT® VITAMIN B12 (LGE) AOAC "First Action" certified	Immunoaffinity columns for sample clean-up prior to the analysis of vitamin B12 using HPLC or LC-MS/MS	10 columns (10 ml format) 50 columns (10 ml format)	RBRP88 RBRP88B
EASI-EXTRACT® FOLIC ACID	Immunoaffinity columns for sample clean-up prior to the analysis of folic acid using HPLC or LC-MS/MS	10 columns (3 ml format) 50 columns (3 ml format)	RBRP81 RBRP81B
EASI-EXTRACT® BIOTIN	Immunoaffinity columns for sample clean-up prior to the analysis of biotin using HPLC or LC-MS/MS	10 columns (3 ml format) 50 columns (3 ml format)	RBRP82 RBRP82B
EASI-EXTRACT® MULTI-VIT B (LGE)	Immunoaffinity columns for sample clean-up prior to the analysis of biotin, vitamin B12 and folic acids using HPLC	10 columns (10 ml Format) 50 columns (10 ml Format)	RBRP183 RBRP183B
ELISA Microtiter Plates			
RIDASCREEN®FAST Vitamin B12	Enzyme immunoassay for quantitative analysis of vitamin B12 in fortified food and vitamin products Detection limit: 0.5 - 25 ppb depending on matrix	48 determinations Incubation time: 25 min	R2102
RIDASCREEN® Biotin	Enzyme binding assay for quantitative analysis of biotin in fortified food and vitamin products Detection limit: 0.37 - 5.5 ppb depending on matrix	96 determinations Incubation time: 1 hr 30 min	R2201
RIDASCREEN®FAST Folsäure (Folic Acid)	Enzyme immunoassay for quantitative analysis of folic acid in fortified food and vitamin products Detection limit: 10 - 1000 ppb depending on matrix	48 determinations Incubation time: 25 min	R3202