

Alanine aminotransferase (ALT/GPT)-Liquizyme (1 + 1) E.C.2.6.1.1.

REF: 263 001 (2 x 25 ml) 50 test
REF: 263 002 (4 x 25 ml) 100 test
REF: 263 003 (2 x 100 ml) 200 test

Intended Use

Spectrum Diagnostics liquizyme ALT reagent is intended for the in-vitro quantitative, diagnostic determination of ALT in human serum on both automated and manual systems.

Background

The enzyme alanine aminotransferase (ALT) is widely distributed with high concentrations in the liver and to a lesser extent in kidneys, heart, skeletal muscles, pancreas and lungs. Elevated serum ALT is found in hepatitis, cirrhosis, obstructive jaundice, liver carcinoma, and chronic alcohol abuse. ALT is only slightly elevated in patients who have an uncomplicated myocardial infarction. Although both AST and ALT become elevated whenever disease processes affect liver cell integrity, ALT is the more liver specific enzyme. Moreover, elevations of ALT activity persist longer than elevations of AST activity.

Method

Kinetic method according to the International Federation of Clinical Chemistry (IFCC) ⁽³⁾.

Assay Principle

The series of the reactions involved in the assay system is as follows:

- The amino group is enzymatically transferred by ALT present in the sample from alanine to the carbon atom of 2-oxoglutarate yielding pyruvate and L-glutamate.



- Pyruvate is reduced to lactate by LDH present in the reagent with the simultaneous oxidation of NADH to nicotinamide adenine dinucleotide (NAD). The reaction is monitored by measuring the rate of decrease in absorbance at 340 nm due to the oxidation of NADH.



- Endogenous sample pyruvate is rapidly and completely reduced by LDH during the initial incubation period so that it does not interfere with the assay.



Reagents

Reagent 1 (R1 Buffer / Enzyme)










Tris buffer (pH 7.4) 100 mmol/L
L- Alanine 1.4 mol/L
LDH ≥ 3500 U/L
Sodium Azide 0.06 mmol/L

Reagent 2 (R2 Coenzyme)

NADH ≥ 0.06 mmol/L
2-Oxoglutarate 4 mmol/L
Sodium Azide 8 mmol/L

For further information, refer to the Alanine aminotransferase reagent material safety data sheet.

SYMBOLS IN PRODUCT LABELLING

	Authorised Representative		Use by/Expiration Date
	For in-vitro diagnostic use		CAUTION. Consult instructions for use
	Batch Code/Lot number		Manufactured by
	Catalogue Number		(Xi) - Irritant
	Consult instructions for use		Temperature Limitation

Precautions and Warnings

Do not ingest or inhale. In case of contact with eyes or skin; rinse immediately with plenty of soap and water. In case of severe injuries; seek medical advice immediately.

Both reagents (R1) and (R2) contain sodium azide which may react with copper or lead plumbing.

Reagent Preparation, Storage and Stability

All reagents are supplied ready to use and stable until expiration date stated on label when stored refrigerated at 2 - 8 °C. Once opened, the reagent is stable for 2 months at the specified temperature. Working solution can be prepared by adding equal volumes from R1 and R2. Stability: 2 days at 2 - 8 °C.

Deterioration

Do not use liquizyme ALT reagent if it is turbid or if the absorbance of the working reagent is less than 1.0 at 340 nm. Failure to recover control values within the assigned range may be an indication of reagent deterioration.

Specimen Collection and Handling

Use nonhaemolyzed serum or plasma. Heparin and EDTA are the only acceptable anticoagulants; avoid other anticoagulants. The biological half-life of ALT in serum is 47 hours.

Stability: 3 days at 15 - 25 °C, 7 days at either 4- 8°C or at - 20°C.

System Parameters

Wavelength	340 nm (334 – 365 nm)
Optical path	1 cm
Assay type	Kinetic
Direction	decrease
Sample: Reagent Ratio	1 : 10
e.g. : Reagent volume	1 ml
Sample volume	100 µl
Temperature	37 °C or 30 °C
Equilibration time	30 seconds.
Read time	1 to 3 minutes
Zero adjustment	Against air
Reagent Blank Limits	Low 1.00 AU High 2.5 AU
Sensitivity	5 U/L
Linearity	400 U/L

Procedure

Pipette in a test tube:

Working solution	1 ml	(Or 0.5 ml R1 + 0.5 ml R2)
Specimen	100 µl	

Mix, read initial absorbance after 30 seconds and start timer simultaneously. Read again after 1, 2 and 3 minutes. Determine the mean absorbance change per minute ($\Delta A/\text{min}$).

Calculation

To calculate the ALT/GPT activity use the following formula

$$\begin{aligned} \text{U/l} &= 1780 \times \Delta A \text{ 334 nm /min} \\ \text{U/l} &= 1746 \times \Delta A \text{ 340 nm /min} \\ \text{U/l} &= 3235 \times \Delta A \text{ 365 nm /min} \end{aligned}$$

Quality Control

Normal and abnormal commercial control serum of known concentrations should be analyzed with each run.

Performance Characteristics

Precision

Within run (Repeatability)

	Level 1	Level 2
n	20	20
Mean (U/L)	103	190
SD	6.1	13
CV%	5.92	6.84

Run to run (Reproducibility)

	Level 1	Level 2
n	20	20
Mean (U/L)	107	188
SD	10.8	16
CV%	10.1	8.51

Methods Comparison

A comparison between Spectrum Diagnostics ALT (1+1) reagent and a commercial reagent of the same methodology was performed on 20 human sera. A correlation of 0.997 was obtained.

Sensitivity

When run as recommended, the minimum detection limit of this assay is 5.0 U/L.

Linearity

The reaction is linear up to ALT concentration of 400 U/L; specimens showing higher concentration should be diluted 1+5 with physiological saline and repeat the assay (result×6).

Interfering Substances

Haemolysis

Erythrocyte contamination elevates results, since ALT activities in erythrocytes are 3 to 5 times higher than those in normal sera.

Icterus

No significant interference.

Lipemia

Lipemic specimens may cause high absorbance flagging. Diluted sample is recommended.

Anticoagulants

Citrate and fluoride inhibit the enzyme activity.

Drugs

Calcium dobesilate and doxycycline HCL cause artificially low ALT values at the tested drug level.

Expected values

37 °C Females up to 31 U/l (up to 0.52 µKat/L)
males up to 41 U/l (up to 0.68 µKat/L)

30 °C Females up to 22 U/l (up to 0.37 µKat/L)
males up to 29 U/l (up to 0.48 µKat/L)

Temperature conversion factor is 1.32 (25 → 30 °C) and 1.85 (25 → 37 °C)

Spectrum Diagnostics does not interpret the results of a clinical laboratory procedure; interpretation of the results is considered the responsibility of qualified medical personnel. All indications of clinical significance are supported by literature references.

Analytical Range

5 – 400 U/L.

Waste Disposal

This product is made to be used in professional laboratories. Please consult local regulations for a correct waste disposal.

S56: dispose of this material and its container at hazardous or special waste collection point.

S57: use appropriate container to avoid environmental contamination.

S61: avoid release in environment. refer to special instructions/safety data sheets.

References

1. Breuer J, report on the symposium "drug effects in clinical chemistry methods". Eur J Clin Chem Clin. 1996;34:385-386.
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5. Sherwin JE. Liver function. In:kaplan LA, PESCE AJ, eds. Clinical chemistry, theory,analysis, and correlation. St louis:mosby;1984:420-438.
6. Young DS. Effects of drugs on clinical laboratory tests. Third edition. 1990 :3:6-12.
7. Zilva JF, pannall PR : plasma enzymes in diagnosis in clinical chemistry in diagnosis and treatment lioyd-luke london 1979:chap 17 : 338.

ORDERING INFORMATION

CATALOG NO.	QUANTITY
263 001	2 x 25 ml
263 002	4 x 25 ml
263 003	2 x 100 ml



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