

Lipase, Enzymatic, colorimetric

(en) English

REF	Content
D01441	4 x 50 mL R1 + 1 x 50 mL R2
D01440	4 x 25 mL R1 + 1 x 25 mL R2
D01443	4 x 10 mL R1 + 1 x 10 mL R2
D44911	4 x 50 mL R1 + 2 x 25 mL R2
D0433917	4 x 50 mL R1 + 1 x 50 mL R2
DA0837	4 x 20 mL R1 + 1 x 20 mL R2
DT1037	4 x 20 mL R1 + 1 x 20 mL R2
DK0735	4 x 50 mL R1 + 1 x 50 mL R2
DE1837	2 x 50 mL R1 + 2 x 12.5 mL R2
DB20327	4 x 50 mL R1 + 1 x 12.5 mL R2

For professional in vitro diagnostic use only.

INTENDED USE

Diagnostic reagent for quantitative in vitro determination of lipase in human serum or plasma on photometric systems.

DIAGNOSTIC SIGNIFICANCE^{1,2}

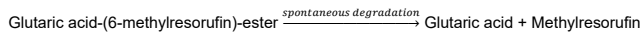
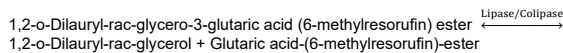
Lipases are enzymes which hydrolyze glycerol esters of long fatty acids. The enzyme and its cofactor colipase are produced in the pancreas. In small amounts, lipase is also secreted by the salivary glands as well as by gastric, pulmonary and intestinal mucosa. Bile acids and colipase form micellar complexes with the lipids and bind lipase on the substrate/water interface.

Determination of lipase is used for investigation of pancreatic disorders. In acute pancreatitis the lipase concentrations rise to 2 – 50 fold the upper reference limit within 4 – 8 hours after the beginning of abdominal pain peaking at 24 hours and decrease within 8 to 14 days. Elevated lipase values can also be observed in chronic pancreatitis and obstruction of the pancreatic duct.

TEST PRINCIPLE

The colour substrate 1,2-o-dilauryl-rac-glycero-3-glutaric acid-(6-methylresorufin) ester is cleaved by pancreatic lipase in the presence of colipase and bile acids, and the resulting dicarboxylic acid ester is hydrolysed under alkaline test conditions to yield the chromophore methylresorufin.

The kinetic of colour formation at 580 nm is monitored and it is proportional to lipase activity in the sample.



REAGENT COMPOSITION

COMPONENTS	CONCENTRATION
Reagent 1	
Good's Buffer	pH 8.0
Colipase	≥ 1 mg/L
Desoxycholate	≥ 1.0 mmol/L
Taurodesoxycholate	≥ 1.0 mmol/L
Calcium ions	≥ 1.0 mmol/L
Detergent	
Preservative	
Reagent 2	
Tartrate Buffer	pH 4.0
Lipase Substrate	≥ 0.1 mmol/L
Stabilizer	
Preservative	

MATERIAL REQUIRED BUT NOT PROVIDED

Standard or Calibrator eg:

REF	Name	Content
D98485	Diacal Auto	5 x 3 mL
D98485SV	Diacal Auto	1 x 3 mL

Controls, eg:

REF	Name	Content	Description
D98481	Diacon N	12 x 5 mL	Control normal
D14481	Diacon N	5 x 5 mL	Control normal
D98481SV	Diacon N	1 x 5 mL	Control normal
D98482	Diacon P	12 x 5 mL	Control abnormal
D14482	Diacon P	5 x 5 mL	Control abnormal
D98482SV	Diacon P	1 x 5 mL	Control abnormal

- NaCl solution (9 g/L).
- Photometric device.
- General laboratory equipment.

REAGENT PREPARATION

Reagents are ready to use.
 Avoid strong shaking!

STORAGE AND STABILITY

Conditions	Store at 2 – 8 °C. Protect from light. Close immediately after use. Avoid contamination. Do not freeze the reagents!
Stability	60 days after first opening of the primary container

Reagent R2 is a microemulsion. Therefore, a slight apparent precipitation could occur, showing a light red deposit on the bottom of vial. This is normal. It is recommended to resuspend solution before analysis, with a mild shaking.

WARNINGS AND PRECAUTIONS

1. Reagent 2: Danger.



H318: Causes serious eye damage.

P280: Wear protective gloves/protective clothing/eye protection.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P310: Immediately call a doctor.

2. Reagent 1 contains sodium azide (0.95 g/L) as preservative. Do not swallow! Avoid contact with skin and mucous membranes.
3. Many other clinical reagents contain lipase or high concentrations of detergents. Avoid contamination and carry over!
4. Special care should be taken in combination with triglycerides, HDL and LDL reagents containing microbial lipases that could stick on the surface of instrument cuvettes. Cuvettes and other glassware must be cleaned thoroughly after being used for other assays. In case of automated measurement refer to the instrument manual for special washing programs before lipase determination.
5. Please refer to the safety data sheets and take the necessary precautions for the use of laboratory reagents.
6. For diagnostic purposes, the results should always be assessed with the patient's medical history, clinical examinations and other findings.
7. In the event of an incident related to the device, report it to the manufacturer and your competent authority as required.
8. For professional use only!

SPECIMEN COLLECTION AND STORAGE

Serum, heparinized plasma.

Stability ⁹ :		
In serum/plasma	at 2 - 8 °C	7 days
Discard contaminated specimens.		

TEST PROCEDURE

Method: Enzymatic colorimetric, kinetic, increasing reaction

Wavelength: 580 nm

Optical path: 1 cm

Temperature: 37 °C

Bring reagents and samples to room temperature.

Pipette into test tubes	Blank	Calibrator	Sample
Reagent 1	1000 µL	1000 µL	1000 µL
Sample	-	-	20 µL
Calibrator	-	20 µL	-
Dist. water	20 µL	-	-
Mix carefully (do not shake!), incubate 5 min. at 37 °C. Then add:			
Reagent 2	250 µL	250 µL	250 µL
Mix. Incubate 2 min. at 37°C, read absorbance against Reagent blank and start stop watch. Read absorbance again after exactly 1 and 2 minutes. Calculate: $\Delta A/\text{min} = [\Delta A/\text{min sample or calibrator}] - [\Delta A/\text{min blank}]$			

Automation

Special adaptations for automated analysers can be made on request.

INTERPRETATION OF RESULTS

Calculation

Serum/Plasma:

$$\text{Lipase [U/L]} = \frac{\Delta A/\text{min Sample}}{\Delta A/\text{min Calibrator}} \times \text{Conc. Calibrator [U/L]}$$

Unit Conversion

$$\text{Lipase [U/L]} \times 0.01667 = \text{Lipase [\mu\text{kat/L}]}$$

QUALITY CONTROL AND CALIBRATION

It is suggested to perform an internal quality control. We recommend the DIALAB serum controls **Diacon N** (control serum with values in the normal range) and **Diacon P** (control serum with values in the abnormal range). Each laboratory should establish corrective action in case of deviations in control recovery.

Calibration

The assay requires the use of a Lipase Standard or Calibrator.
 We recommend the DIALAB multi calibration serum **Diacal Auto**.

PERFORMANCE CHARACTERISTICS

Tests were performed on the instrument llab650.

Exemplary data mentioned below may slightly differ in case of deviating measurement conditions.

Precision

Within run (n=10)	Sample 1	Sample 2
Mean [U/L]	49.9	110.5
CV [%]	1.30	1.53
Between day (n=20)	Sample 1	Sample 2
Mean [U/L]	50.0	110.9
CV [%]	2.87	3.53

Analytical Sensitivity

Limit of detection: 1 U/L.

Linearity and measuring range

The assay has been developed to determine lipase within a measuring range from 1 – 300 U/L. If this value is exceeded, samples should be diluted 1 + 1 with NaCl solution (9 g/L) and the result multiplied by 2.

Analytical specificity

Interfering substance	No interference up to:
Ascorbic acid	50 mg/dL
Bilirubin	50 mg/dL
Hemoglobin	400 mg/dL
Lipemia (Triglycerides)	1000 mg/dL

For further information on interfering substances refer to Young DS¹⁰.

Clinical performance

Method comparison (n=76)	
Test x	DIALAB Lipase, Enzymatic, colorimetric Previous formulation
Test y	DIALAB Lipase, Enzymatic, colorimetric Current formulation
Slope	1.017
Intercept	-1.452 U/L
r ²	0.990

TRACEABILITY

The assigned values of Lipase in the calibrator Diacal Auto have been made traceable to the molar extinction coefficient ϵ according to an available measurement procedure.

EXPECTED VALUES

Normal subjects ⁹	≤ 60 U/L (≤ 1.00 μ kat/L)
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Each laboratory should check if the reference ranges are transferable to its own patient population and determine own reference ranges if necessary.

LIMITATIONS

- Eventual Lipase (Enzymatic, colorimetric) carry-over to reagents Calcium (Arsenazo), Calcium (CPC), Magnesium (Xylidyl blue) and Triglycerides (GPO-PAP). The actual carry-over depends on the analyser.

WASTE MANAGEMENT

Please refer to local legal requirements.

LITERATURE

- Lorentz K. Lipase. In: Thomas L, editor. Clinical laboratory diagnostics. 1st ed. Frankfurt: TH-Books Verlagsgesellschaft; 1998. p. 95-7.
- Moss DW, Henderson AR. Digestive enzymes of pancreatic origin. In: Burtis CA, Ashwood ER, editors. Tietz Textbook of Clinical Chemistry. 3rd ed. Philadelphia: W.B Saunders Company; 1999. p. 689-708.
- Tietz N, Shuey DF. Lipase in serum – the elusive enzyme: an overview. Clin Chem 1993;39:746-56.
- Lott J, Patel ST, Sawhney AK, Kazmierczak SC, Love JE. Assays of serum lipase: analytical and clinical considerations. Clin Chem 1986;32:1290-1302.
- Leybold A, Junge W. Importance of colipase for the measurement of serum lipase activity. Adv Clin Enzymol 1986;4:60-7.
- Borgström B. The action of bile salts and other detergents on pancreatic lipase and the interaction with colipase. Biochimica et Biophysica Acta 1977;488:381-91.
- Gargouri Y, Julien R, Bois A, Verger R, Sarda L. Studies on the detergent inhibition of pancreatic lipase activity. J of Lipid Research 1983;24:1336-42.
- Junge W, Abicht K, Goldman J. Evaluation of the colorimetric liquid assay for pancreatic lipase on Hitachi analyzers in 7 clinical centres in Europe. Clin Chem Lab Med 1999; 37, Special suppl: 469.
- Rifai N., Horvath A.R., Wittwer C.T. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics - sixth edition ed. 2017 p. 421-424.
- Young DS. Effects of Drugs on Clinical Laboratory Tests. 5th ed. Volume 1 and 2. Washington, DC: The American Association for Clinical Chemistry Press 2000.

