

Liquid Reagents - ready to use

TRIGLYCERIDES

GPO-PAP with ATCS*

Single Reagent

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

Ref.No.	Kit Size	Content
DIA010212	5 x 25 ml	Single Reagent
DIA010213	5 x 50 ml	Single Reagent
DIA010214	5 x 100 ml	Single Reagent

Additionally offered:

Ref.No.	Kit Size	Content
DIA060110	1 x 3 mL	Triglycerides STANDARD
DIA040012	1 x 3 mL	Diacal Auto (Calibrator)
DIA030012	1 x 5 mL	Diacon N (Control Normal)
DIA030022	1 x 5 mL	Diacon P (Control Abnormal)
DIA030030	1 x 5 mL	Diacon Urine Level 1 (Control Normal)
DIA030035	1 x 5 mL	Diacon Urine Level 2 (Control Abnormal)

*Advanced Turbidity Clearing System; minimizes turbidity caused by lipemia.

TEST PARAMETERS

Method:	Colorimetric, enzymatic, GPO – PAP, endpoint, increasing reaction
Wavelength	500 nm, Hg 546 nm
Temperature:	20-25°C or 37°C
Sample:	Serum, heparinized or EDTA-plasma.
Linearity:	up to 1000 mg/dL (11.3 mmol/L).
Sensitivity:	Lower limit of detection: 2 mg/dL (0.02 mmol/L).

SUMMARY [1,2]

Triglycerides are esters of glycerol with three fatty acids and are the most abundant naturally occurring lipids. They are transported in plasma bound to apolipoproteins forming very low density lipoproteins (VLDL) and chylomicrons. Measurement of triglycerides is used in screening of the lipid status to detect atherosclerotic risks and in monitoring of lipid lowering measures. Studies have shown that elevated triglyceride concentrations combined with increased low density lipoprotein (LDL) concentrations constitute an especially high risk for coronary heart disease (CHD). High triglyceride levels also occur in various diseases of liver, kidneys and pancreas.

REAGENT COMPOSITION

COMPONENTS	CONCENTRATIONS	
Good's Buffer, pH 7.2	50	mmol/L
4 Chlorophenol	4	mmol/L
Mg ²⁺	15	mmol/L
ATP	2	mmol/L
Glycerolkinase (GK)	≥0.4	kU/L
Peroxidase (POD)	≥2	kU/L
Lipoproteinlipase (LPL)	≥2	kU/L
4-Aminoantipyrine	0.5	mmol/L
Glycerol-3-phosphate-oxidase (GPO)	≥0.5	kU/L

REAGENT PREPARATION

The reagent is ready to use.

MATERIALS REQUIRED BUT NOT PROVIDED

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

TEST PRINCIPLE

Determination of triglycerides after enzymatic splitting with lipoprotein lipase. Indicator is quinoneimine which is generated from 4-aminoantipyrine and 4-chlorophenol by hydrogen peroxide under the catalytic action of peroxidase.

Triglycerides $\xrightarrow{\text{LPL}}$ Glycerol + fatty acid

Glycerol + ATP $\xrightarrow{\text{GK}}$ Glycerol-3-phosphate + ADP

Glycerol-3-phosphate + O₂ $\xrightarrow{\text{GPO}}$ Dihydroxyacetone phosphate + H₂O₂

2 H₂O₂ + Aminoantipyrine + 4-Chlorophenol $\xrightarrow{\text{POD}}$ Quinoneimine + HCl + 4 H₂O

REAGENT STABILITY AND STORAGE

Conditions: protect from light! Avoid contamination!
close immediately after use.
do not freeze the reagent!

Storage: at 2 - 8°C

Stability: up to the expiration date

Note: The measurement is not influenced by occasionally occurring color changes, as long as the absorbance of the reagent is < 0.3 at 546 nm.

SAMPLE STABILITY AND STORAGE

Stability [4]: at 20 - 25°C 2 days
at 4 - 8°C 7 days
at -20°C at least one year

Discard contaminated specimens. Freeze only once!

STANDARD

(not included in the kit – has to be ordered separately)

Concentration: 200 mg/dL (2.25 mmol/L)

Storage: 2 – 8°C

Stability: up to the expiration date

Close immediately after use! Avoid contamination!

MANUAL TEST PROCEDURE

Bring reagents and samples to room temperature.

Pipette into test tubes	Blank	Std./Cal.	Sample
Reagent	1000 µl	1000 µl	1000 µl
Sample	-	-	10 µl
Standard/Calibrator	-	10 µl	-
Dist water	10 µl	-	-

Mix. Incubate 10 minutes at 37 °C or 20 minutes at 20 – 25 °C. Measure absorbance of sample and std./cal. within 60 minutes against the reagent blank.

CALCULATION

Triglycerides [mg/dL] = $\frac{\Delta A \text{ Sample}}{\Delta A \text{ Std./Cal.}} \times \text{Conc. Std./Cal. [mg/dL]}$

To correct for free glycerol, subtract 10 mg/dL (0.11 mmol/L) from the triglycerides value calculated above.

UNIT CONVERSION

mg/dL x 0.01126 = mmol/L

REFERENCE RANGE [2] *

	mg/dL	mmol/L
Desirable (fasting):	< 200	2.3
Borderline high:	200 – 400	2.3 – 4.5
Elevated:	> 400	4.5

* Each laboratory should check if the reference ranges are transferable to its own patient population and determine own reference ranges if necessary.

Clinical Interpretation [3]

Epidemiological studies have observed that a combination of plasma triglycerides > 180 mg/dL (> 2.0 mmol/L) and HDL-cholesterol < 40 mg/dL (1.0 mmol/L) predict a high risk of CHD. Borderline levels (> 200 mg/dL) should always be regarded in association with other risk factors for CHD.

PERFORMANCE CHARACTERISTICS

LINEARITY, MEASURING RANGE

The test has been developed to determine triglycerides concentrations within a measuring range from 2 – 1000 mg/dL (0.02 – 11.3 mmol/L). If values exceed this range, samples should be diluted 1+4 with NaCl solution (9 g/L) and the result multiplied by 5.

SENSITIVITY/LIMIT OF DETECTION

The lower limit of detection is 2 mg/dL (0.02 mmol/L).



PRECISION (at 37°C)

Intra-assay n = 20	Mean [mg/dL]	SD [mg/dL]	CV [%]
Sample 1	121	2.16	1.78
Sample 2	140	2.18	1.56
Sample 3	307	3.91	1.27
Inter-assay n = 20	Mean [mg/dL]	SD [mg/dL]	CV [%]
Sample 1	108	3.20	2.98
Sample 2	125	2.78	2.23
Sample 3	279	5.34	1.91

SPECIFICITY/INTERFERENCES

no interference up to:

Ascorbic acid	5 mg/dL
Bilirubin, conjugated	40 mg/dL
Bilirubin, unconjugated	9 mg/dL
Hemoglobin	500 mg/dL

For further information on interfering substances refer to Young DS [5].

METHOD COMPARISON

A comparison between Diagnostica Triglycerides (y) and a commercially available test (x) using 107 samples gave following results: $y = 0.985x + 1.684$ mg/dL; $r = 0.999$.

CALIBRATION

The assay requires the use of a Triglycerides Standard or Calibrator.

We recommend the Diagnostica **Triglycerides Standard** or the multi calibration serum **Diacal Auto**. The assigned values of the calibrator have been made traceable to the reference method gas chromatography – isotope dilution mass spectrometry (CG-IDMS).

QUALITY CONTROL

All control sera with Triglycerides values determined by this method can be used.

We recommend the Diagnostica lipid control sera **Diacon Lipids** and **Diacon Lipids High** and the Diagnostica multi control sera **Diacon N** (with values in the normal range) and **Diacon P** (with values in the pathological range).

Each laboratory should establish corrective action in case of deviations in control recovery.

AUTOMATION

Special applications for automated analysers can be made on request.

WARNINGS AND PRECAUTIONS

1. The reagent contains sodium azide (0.95 g/L) as preservative. Do not swallow! Avoid contact with skin and mucous membranes.
2. The reagent contains biological material. Handle the product as potentially infectious according to universal precautions and good laboratory practice.
3. In very rare cases, samples of patients with gammopathy might give falsified results [6].
4. N-acetylcysteine (NAC), acetaminophen and metamizole medication leads to falsely low results in patient samples.
5. Please refer to the safety data sheet 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. For professional use only!

WASTE MANAGEMENT

Please refer to local legal requirements.

