

## Alpha-Amylase

### Colorimetric - Kinetic method

**IVD** For *In-Vitro* diagnostic and professional use only

2°C  $\uparrow$  8°C  
Store at 2-8°C



#### INTENDED USE

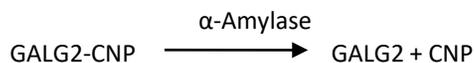
Atlas Alpha-amylase reagent is used for quantitative of alpha-amylase in human serum and plasma.

#### INTRODUCTION

Atlas Alpha-amylase is a type of enzyme (biological catalyst) which reduces the activation energy required in the hydrolysis of starch which thus speeds up the reaction rate. Measurements of  $\alpha$ -Amylase are used to primarily in the diagnosis and treatment of the diseases of the pancreas, Amylase is found primarily in the pancreas and salivary glands. When released in the digestive tract, the enzyme hydrolyzes starch.

#### PRINCIPLE

Atlas Alpha amylase catalyze the hydrolysis of 2-chloro-4-nitrophenyl-1-galactopyranosyl-malioside (GALG2-NP) to glucose polymers and p-nitrophenyl oligosaccharide at short chain producing 2-chloro-4-nitrophenol (CNP). The increased extension can be measured by spectrophotometry at 405nm and results proportional at the activity of alpha amylase present in the sample.



#### REAGENT COMPOSITION:

Sodium Citric acid buffer	100 mmol/L (pH 6.0)
Sodium chloride	300 mmol/L
GALG2-CNP	2.65 mmol/L
EDTA	0.2 mmol/L
Stabilizers and detergents	<0.1%

#### MATERIALS REQUIRED BUT NOT PROVIDED

- Photometer or spectrophotometer with a thermostatted cell compartment set at 37°C, capable of reading at 405 nm.
- Stopwatch, strip-chart recorder or printer.
- Cuvettes with 1-cm path length.
- Pipettes to measure reagent and samples.

#### STORAGE AND STABILITY

- Store at 2-8°C.
- All the kit compounds are stable until the expiry date stated on the label. Do not use reagents over the expiration date.
- Store the vials tightly closed and prevented contamination during the use. Avoid contamination and recap the vials immediately after use.

#### Discard If signs of deterioration appear:

- Presence of particles and turbidity.
- Blank absorbance (A) at 405 nm > 0.5 in 1 cm cuvette.

#### REAGENT PREPARATION

The alpha amylase reagent is ready-to-use.

#### SAMPLES COLLECTION AND PREPARATION

- Serum or plasma.
- To prepare the serum sample; the whole blood sample shall be collected using plain tube (No anticoagulant tube).
- To prepare the plasma sample; the whole blood sample shall be collected using sodium heparin, sodium citrate or EDTA anticoagulant tubes.
- Serum and plasma  $\alpha$ -amylase is stable for 30 days at 2-8°C.

#### PROCEDURE 1 (Kinetic Method)

Wavelength =405 nm.

Light path = 1 cm.

Temperature = 37°C.

Measurement : against reagent blank (Blank: not necessary).

Reaction: Kinetic Increase.

1. Preincubate working reagent, samples and controls to reaction temperature.
2. Set the photometer to 0 absorbance with distilled water.
3. Pipette into a cuvette:

Reaction temperature	37°C	
	Blank	Sample
R1.Monoreagent	1.0 mL	1.0 mL
Dist. Water or saline	40 $\mu$ l	.....
Sample	.....	40 $\mu$ l

4. Mix gently by inversion. Insert cuvette into the cell holder and start stopwatch. Incubate at 37°C for 1 minute and record initial absorbance reading.
5. Read the absorbance (at 405nm) exactly after 1, 2 and 3 minutes.
6. Calculate the difference between absorbances.
7. Calculate the mean of the results to obtain the average change in absorbance per minute ( $\Delta A/\text{min}$ ).

#### CALCULATIONS

Alpha Amylase (U/L) =  $\Delta A/\text{min} \times 3178$

#### PROCEDURE 2 (Fixed rate colorimetric method)

Wavelength =405 nm.

Light path = 1 cm.

Temperature = 37°C.

Measurement: against reagent blank.

Reaction: Fixed Increase.

1. Preincubate working reagent, samples and controls to reaction temperature.
2. Set the photometer to 0 absorbance with distilled water.
3. Pipette into a cuvette:

	Sample
Reagent	1.0 ml
Sample	40 $\mu$ l

4. Mix gently by inversion. Insert cuvette into the cell holder and start stopwatch. Incubate at 37°C for 1 minute and record initial absorbance reading (A1).
5. Read the absorbance 2 (A2) exactly after 4 minutes.

#### CALCULATIONS

$\Delta A = A2 - A1$

Alpha Amylase (U/L) =  $\Delta A \times 794$

#### REFERENCE VALUES

Serum/ Plasma	25°C	30°C	37°C
	Up to 55 U/L	Up to 73 U/L	Up to 100 U/L

It is recommended that each laboratory establishes its own reference range.

## QUALITY CONTROL

To ensure adequate quality control (QC), each run should include a set of controls (normal and abnormal) with assayed values handled as unknowns.

Elevated level of  $\alpha$ -amylase. Assayed.

If the values are found outside of the defined range, check the instrument, reagents and procedure. Each laboratory should establish its own Quality Control scheme and corrective actions if controls do not meet the acceptable tolerances.

## CLINICAL SIGNIFICANCE

Amylase activity tests in serum and urine are mainly used in the diagnosis of diseases of the pancreas and in the investigation of pancreatic function.

Amylase is found chiefly in the saliva and in pancreatic tissue.

Normally, small amounts of amylase are present in the blood, but with various forms of pancreatic disturbance large amounts of amylase are secreted into the blood by the pancreas.

The activity of the amylase in serum may fluctuate rapidly rising acutely during an attack and subsiding to normal levels shortly afterward.

Increased levels are found associated with acute pancreatitis, pancreatic duct obstruction, intra-abdominal diseases, mumps and bacterial parotitis.

A significant amount of the serum amylase is excreted in the urine, and as a result elevation of serum activity is reflected in the rise of urinary amylase activity. Urine amylase appears to be more frequently elevated, reaches higher levels, and persists for longer periods.

## ANALYTICAL PERFORMANCE

**Linearity:** 1500 U/L.

**If a sample exceeds 1500 U/L, it should be diluted 1:1 with normal saline and re-assayed. Multiply the result by 2.**

**Measured Range:** 20-1500 U/L.

## Precision:

### A) Within-run reproducibility

Within series n=20	Mean (U/L)	SD (U/L)	CV (%)
Sample 1	18.91	0.71	3.76
Sample 2	141.4	1.63	1.15
Sample 3	78.9	1.16	1.47

### B) Between-run reproducibility

Day to day n=20	Mean (U/L)	SD (U/L)	CV (%)
Sample 1	18.909	0.37	3.76
Sample 2	141.421	1.630	1.153
Sample 3	78.973	1.164	1.474

## Correlation Study:

The comparison study of ATLAS Alpha Amylase reagent with commercially kits was performed using 99 clinical sample. The result show that there is no systematic differences between ATLAS Alpha Amylase and other commercial kit; the results presented as below:

$$y = 1.1164X - 4.963U/L, R^2 = 0.9975.$$

## Interferences

no interference up to:

ascorbic acid	500 mg/dL
Free bilirubin	20 mg/dL
hemoglobin	500 mg/dL
Bilirubin Conjugated	20 mg/dL
NaF	500 mg/dL
Glucose	5.0 g/dL
Maltose	5.0 g/dL

## WARNINGS AND PRECAUTIONS

- For *In Vitro* Diagnostic Use.
- Take the necessary precautions for the use of laboratory reagents.
- Avoid contamination of the reagent with salivary  $\alpha$ -amylase. Do not pipette by mouth, and ensure that the reagent does not come into contact with the skin. (Saliva and sweat contain  $\alpha$ -amylase)
- Contains Potassium Thiocyanate. Potassium thiocyanate is not compatible with strong acids.
- Contains sodium azide, which may react with lead or copper plumbing to form potentially explosive metal azide. On disposal, flush drain with a large volume of water to prevent build up.

## REFERENCES

1. Ranson, JHC, Curr. Prob. Surg., 16:1 (1979).
2. Salt, WB II and Schenker, S., Medicine, 55:269 (1976).
3. Stefanini, P., Ermini, M., and Carboni, M., J.Am.Surg., 119:866 (1965).
4. Henry, RJ, and Chiamori, N., Clin Chem., 6:434 (1960).
5. Kaufman, RA and Tietz, NW, Clin Chem., 26:846 (1980).

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 Catalogue Number	 Temperature limit
 <i>In Vitro</i> diagnostic medical device	 Caution
 Contains sufficient for <n> tests and Relative size	 Consult instructions for use (IFU)
 Batch code	 Manufacturer
 Fragile, handle with care	 Use-by date
 Manufacturer fax number	 Do not use if package is damaged
 Manufacturer telephone number	 Date of Manufacture
 Keep away from sunlight	 Keep dry