α-Amylase. CNPG$_3$. Kinetic. Liquid Ref.: AMY-002
Quantitative Determination of amylase
Only for *in vitro* use in clinical laboratory
Store at 2-8ºC 3 x 50 mL

α- AMYLASE

CE

PRINCIPLE OF THE METHOD

α-Amylase hydrolyzes the 2-chloro-4-nitrophenyl-α-D-maltotrioside (CNPG3) to release 2-chloro-4-nitrophenol (CNP) and form 2-chloro-4-nitrophenyl-α-D-maltoside (CNPG2), maltotriose (G3) y glucose (G) according to the following reaction:

$$10\ CNPG_3 \xrightarrow{Amilase} 9\ CNP + 1\ CNPG_2 + G_3 + G$$

The rate of 2-chloro-4-nitrophenol formation, measured photometrically, is proportional to the catalytic concentration of □-amylase present in the sample[1].

CLINICAL SIGNIFICANCE

α-Amylase (AMS) is an enzyme that helps to digest the glycogen and the starch. It is produced mainly by exocrine pancreas and salivary glands. This determination is made mainly in diagnosis or to control diseases of the pancreas as acute or chronic pancreatitis. It can also reflect biliary or gastrointestinal disease and other upheavals[2,5,6].
Clinical diagnosis should not be made on a single test result; it should integrate clinical and other laboratory data.

REAGENTS

R	MES pH 6.0	100 mmol/L
	CNPG3	2.25 mmol/L
	Sodium clorhidre	350 mmol/L
	Calcium acetate	6 mmol/L
	Potassium thiocyanate	900 mmol/L
	Sodium azide	0.95 gr/L

PREPARATION

The reagent is ready to use.

STORAGE AND STABILITY

All the components of the kit are stable until the expiration date on the label when stored tightly closed at 2-8ºC, protected from light and contaminations prevented during their use.
Do not use reagents over the expiration date.
After opening, the reagent is stable for 60 days when properly capped immediately after each opening and stored at 2-8ºC.
Signs of reagent deterioration:
- Presence of particles and turbidity.
- Blank absorbance (A) at 405 nm ≥ 0.50.

ADDITIONAL EQUIPMENT

- Spectrophotometer or colorimeter measuring at 405 nm.
- Thermostatic bath at 37ºC(Note 1).
- Matched cuvettes 1.0 cm light path.
- General laboratory equipment(Note 2).

SAMPLES

- Serum or plasma[1], remove from cells as soon as possible. It is recommended to use heparin as anticoagulant.
- Urine, adjust pH to approximately 7.0 prior to storage.

Stability: 1 month at 2-8ºC.

PROCEDURE

1. Assay conditions:
   Wavelength: . . . . . 405 nm
   Cuvette: . . . . . 1 cm light path
   Constant temperature 37ºC
2. Adjust the instrument to zero with distilled water.
3. Pipette into a cuvette:

	Serum or plasma	Urine
R (mL)	1,0	1,0
Sample (□L)	20	10

4. Mix, incubate for 30 seconds.
5. Read initial absorbance (A) of the sample, start the stopwatch and read absorbances at 1 minute intervals thereafter for 3 minutes.
6. Calculate the difference between absorbances and the average absorbance differences per minute (ΔA/min).

CALCULATIONS

Serum or plasma ΔA/min x 3954 = U/L AMS

Urine ΔA/min x 7908 = U/L AMS

Units: One international unit (IU) is the amount of enzyme that transforms 1 μmol of substrate per minute, in standard conditions. The concentration is expressed in units per litre of sample (U/L).

Conversion factor: U/L x 0,01667 = μkat/L.

QUALITY CONTROL

Control sera are recommended to monitor the performance of assay procedures.
If control values are found outside the defined range, check the instrument, reagents and technique for problems.
Each laboratory should establish its own Quality Control scheme and corrective actions if controls do not meet the acceptable tolerances.

REFERENCE VALUES[1]

Serum or plasma	Up to 90 U/L of α-amylase
Urine	Up to 450 U/L of α-amylase

These values are for orientation purpose; each laboratory should establish its own reference range.

PERFORMANCE CHARACTERISTICS

Measuring range: From detection limit of 1 U/L to linearity limit of 2000 U/L.
If the results obtained were greater than linearity limit, dilute the sample 1/2 with NaCl 9 g/L and multiply the result by 2.
Precision:

	Intra-assay (n=20)		Inter-assay (n=20)	
Mean (U/L)	61.2	165	65.1	172
SD	1.00	2.44	2.84	4.57
CV (%)	1.64	1.47	4.36	2.65

Sensitivity: 1 U/L = 0,0003 ΔA / min.
Accuracy: Results obtained using BSM reagents (y) did not show systematic differences when compared with other commercial reagents (x).
The results of the performance characteristics depend on the analyzer used.

INTERFERENCES

Hemolysis interferes in the results[1].
α-Amylase enzyme activity is temperature dependent. Assays performed at temperatures <37ºC or >37ºC will show an apparent decrease or increase levels. A list of drugs and other interfering substances with α-amylase determination has been reported by Young et. al[3,4].

NOTES

1. α-Amylase enzyme activity is temperature dependent. Assays performed at temperatures <37ºC or >37ºC will show an apparent decrease or increase levels.
2. Saliva and sweat contain α-amylase. Avoid mouth pippeting and skin contact with the reagent or material used.
3. Contains potassium thiocyanate. Avoid inhalation, skin or eyes contact.
   If it happens, wash with plenty of water and consult a doctor.
4. **BSM has instruction sheets for several automatic analyzers. Instructions for many of them are available on request.**

BIBLIOGRAPHY

1. Ying Foo A et al. Amylase measurement with 2-chloro-4nitrophenyl maltrotrioside as substrate. Clin Chim 272, 1998; 137-147.
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3. Young DS. Effects of drugs on Clinical Lab. Tests, 4th ed AACC Press, 1995.
4. Young DS. Effects of disease on Clinical Lab. Tests, 4th ed AACC 2001.
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