GLUCOSE MR CE

CONTENTS			
REF	1129005	Glucose MR	2 x 50 mL
	1129010	Glucose MR	4 x 100 mL
	1129015	Glucose MR	4 x 250 mL
	1129020	Glucose MR	5 x 50 mL
For *in vitro* diagnostic use only			

GLUCOSE MR

Enzymatic colorimetric method

ENDPOINT

PRINCIPLE

In the Trinder reaction[1,2], the glucose is oxidized to D-gluconate by the glucose oxidase (GOD) with the formation of hydrogen peroxide. In the presence of peroxidase (POD), a mixture of phenol and 4-aminoantipyrine (4-AA) is oxidized by hydrogen peroxide, to form a red quinoneimine dye proportional to the concentration of glucose in the sample.

$$\beta\text{-D-Glucose} + H_2O + O_2 \xrightarrow{GOD} \text{D-Gluconate} + H_2O_2$$

$$\text{4-AA} + \text{Phenol} \xrightarrow[POD]{H_2O_2} \text{Quinoneimine} + H_2O$$

REAGENT COMPOSITION

R1 **Monoreagent**. Phosphate buffer 100 mmol/L pH 7.5, glucose oxidase > 10 KU/L, peroxidase > 2 KU/L, 4-aminoantipyrine 0.5 mmol/L, phenol 5 mmol/L.

CAL **Glucose standard**. Glucose 100 mg/dL (5.55 mmol/L). Organic matrix based primary standard. Traceable to SRM 914a and 909.

STORAGE AND STABILITY

Store at 2-8ºC.
The Monoreagent and Standard are stable until the expiry date stated on the label.
Discard the reagent if presents an absorbance over 0.300 at 500 nm against distilled water or if it fails to recover the declared values of control sera.

REAGENT PREPARATION

The Monoreagent and the Standard are ready-to-use.

SAMPLES

Serum or heparin plasma free of hemolysis.
Glucose is stable up to 24 hours at 2-8ºC when serum or plasma is separated within 30 minutes after collection.

INTERFERENCES

- Highly icteric or lipemic samples require a blank correction. Use the same volume of sample with isotonic saline in the place of the reagent.
- Several interfering compounds have been described.[3,4]

MATERIALS REQUIRED

- Photometer or colorimeter capable of measuring absorbance at 500 ± 20 nm.
- Constant temperature incubator set at 37ºC.
- Pipettes to measure reagent and samples.

PROCEDURE

1. Bring reagents and samples to room temperature.
2. Pipette into labelled tubes:

TUBES	Blank	Sample	Standard
Monoreagent	1.0 mL	1.0 mL	1.0 mL
Sample	–	10 µL	–
Standard	–	–	10 µL

3. Mix and let stand the tubes 10 minutes at room temperature or 5 minutes at 37ºC.
4. Read the absorbance (A) of the samples and the standard at 500 nm against the reagent blank.

The color is stable for about 2 hours protected from light.

CALCULATIONS

$$\frac{A_{Sample}}{A_{Standard}} \times C_{Standard} = \text{mg/dL glucose}$$

Samples with concentrations higher than 500 mg/dL should be diluted 1:4 with saline and assayed again. Multiply the results by 4.

If results are to be expressed as SI units apply:
mg/dL x 0.0555 = mmol/L

CS/00/034

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REFERENCE VALUES[5]

Serum, plasma (fasting)

Adults	70-105 mg/dL (3.89-5.83 mmol/L)
Children	60-110 mg/dL (3.33-6.11 mmol/L)
Newborns	40-60 mg/dL (2.22-3.33 mmol/L)

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

QUALITY CONTROL

The use of a standard to calculate results allows to obtain an accuracy independent of the system or instrument used.
To ensure adequate quality control (QC), each run should include a set of controls (normal and abnormal) with assayed values handled as unknowns.

REF **1980005** HUMAN MULTISERA NORMAL
Borderline level of glucose. Assayed.

REF **1985005** HUMAN MULTISERA ABNORMAL
Elevated level of glucose. Assayed.

CLINICAL SIGNIFICANCE

Glucose is a major energy source for the human body, derived from the breakdown of carbohydrates obtained from daily diet and regulated through the process of *glycogenolysis* (breakdown of body stored glycogen), and *gluconeogenesis* (endogenous synthesis from aminoacids and other substances).

The glucose level in the blood is maintained by diet uptake and regulatory hormones such as insulin, glucagon, or epinephrine.

An abnormal increase in blood glucose level, referred as *hyperglycemia*, can be associated with diabetes mellitus and hyperactivity of thyroid, pituitary or adrenal glands.
An abnormal decrease beyond the fasting level, referred as *hypoglycemia*, is observed in cases of insulin overdose, insulin secreting tumors, mixedema, hypopituitarism, Addison´s disease and conditions interfering with glucose absorbtion.

Glucose measurement in the blood is a key test to evaluate and diagnose any carbohydrate-related disorder.

NOTES

- Enzymes released from the red cells in hemolyzed samples will cause a consumption of glucose, with resulting false low values.
- Additionally, catalase liberated from the eritrocytes will compete with peroxidase for the hydrogen peroxide, giving also untrue results.

ANALYTICAL PERFORMANCE

- ***Linearity.*** Up to 400 mg/dL
- ***Precision***

mg/dL	Within-run			Between-runl		
Mean	56.1	114.2	360.1	56.1	114.2	360.1
SD	0.63	0.43	2.1	0.67	0.51	2.6
CV%	1.12	0.37	0.58	1.19	0.46	0.72
N	10	10	10	10	10	10

Replicates: 10 for each level. Replicates: 10 for each level
Instrument: CECIL CE 2021 for 6 days.

- ***Sensitivity.*** Using a 1:100 sample/reagent at 510 nm, 1 mg of glucose will produce a net absorbance of approximately 0.004.
- ***Correlation.*** This assay (y) was compared with a similar commercial method (x). The results were:
N = 30 r = 0.995 y = 0.96x - 0.437

REFERENCES

1. Trinder, P. Ann. Clin. Biochem. 6 : 24 (1969).
2. Barham, D. and Trinder, P. Analyst. 97 : 142 (1972).
3. Szasz, B., Hurt, K. and Busch, E.W. J. Clin. Chem. Clin. Biochem. 12 : 256 (1974).
4. Young, D.S., Pestaner, L.G. and Gibberman, P. Clin. Chem. 21, Vol. 5, 10-432D (1975).
5. Tietz. N.W. Clinical Guide to Laboratory Tests, 3rd Edition. W.B. Saunders Co. Philadelphia, PA. (1995).

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