BIOLABO
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MANUFACTURER:
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CREATININE Kinetic method

Reagent for quantitative determination of creatinine in human serum and plasma or urines.

REF 80107 **R1** 1 x 125 mL **R2** 1 x 125 mL **R3** 1 x 10 mL

TECHNICAL SUPPORT AND ORDERS
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CE

IVD

Made In France

I: corresponds to significant modifications

I INTENDED USE

This reagent is designated for professional use in laboratory (manual or automated method).
It allows the quantification of creatinine in human serum and plasma or urines to screen its level.

GENERALITIES (1)

Interconversion of phosphocreatine and creatine is a particular feature of the metabolism processes of muscle contraction. Creatine and phosphocreatine partially convert to a waste product, creatinine. Thus, the amount of creatinine produced each day is related to the muscle mass (and body weight), age, sex, diet or exercise and does not greatly vary from day to day.

PRINCIPLE (4) (5)

Colorimetric reaction (Jaffe reaction) of creatinine with alkaline picrate measured kinetically at 490 nm (490-510), without any pre-treatment step. This reaction has been improved (specificity, speed and adaptability) by the development of an initial-rate method.

REGENTS COMPOSITION

R1 CREATININE Reagent 1

Disodium Phosphate	6.4	mmol/L
Sodium hydroxide	150	mmol/L

Attention:

Met Corr.1: H290 - May be corrosive to metals,

Skin Irrit.2 : H315 - Causes skin irritation,

Eye Irrit.2 : H319 - Causes serious eye irritation

Classification due to: Sodium Hydroxide 1- < 2.5%

P264: Wash hands thoroughly after handling, P280: Wear protective gloves/protective clothing/eye protection/face protection, P302+P352: IF ON SKIN: Wash with soap and water, P305+P351+P338: IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing, P337+P313: If eye irritation persists, get medical advice/attention, P390: Absorb spillage to prevent material damage. For more details, refer to Safety Data Sheet (MSDS).

R2 CREATININE Reagent 2

Sodium dodecyl sulfate	0.75	mmol/L
Picric acid	4.0	mmol/L

pH 4.0

According to 1272/2008 regulation, reagent R2 is not classified as dangerous

Working reagent (R1+R2) is classified as R1.

R3 CREATININE Standard

Refer to the batch specific values (urines and serum) indicated in the label of the vial and in the certificate of analysis.

EUH210: Safety Data Sheet (MSDS) available on request

According to 1272/2008 regulation, reagent R3 is not classified as dangerous

SAFETY CAUTIONS

- Refer to current Material Safety Data Sheet available on request or on www.biolabo.fr
- Verify the integrity of the contents before use.
- Waste disposal: Respect legislation in force in the country.
- All specimens or reagents of biological origin should be handled as potentially infectious. Respect legislation in force in the country.

Any serious incident that has occurred in connection with the device is notified to the manufacturer and the competent authority of the Member State in which the user and/or patient is based.

REAGENTS PREPARATION

Mix 1 volume of R1 and 1 volume of R2

STABILITY AND STORAGE

Stored away from light, well caped in the original vial at 18-25°C, and used as described, reagents are stable:

Unopened:

- Until expiry date stated on the label of the kit.

Once opened:

- Transfer requested quantity, well recap vials and store at 18-25°C
- Separate reagents are stable at least 1 year.

Once reconstituted and free from contamination:

- Reagent (R1+R2) is stable 30 days at 2-8°C
- Discard reagent if cloudy or if its abs. is > 0.300 at 490 nm.
- Don't use working reagent after expiry date

SPECIMEN COLLECTION AND HANDLING (2)

Serum or heparinised plasma.

Urines: Collect during precisely timed interval's (4, 12 or 24 h). Dilute 1+19 in demineralised water before determination.

Creatinine is stable for 24 h at 2-8°C.

LIMITS (1) (2) (3) (5)

Reading interval is the main determinant for the specificity of the Jaffe reaction; some interferents act quickly (acetoacetate) and others slowly (proteins). The majority of kinetic methods recommend a reading interval between 30 and 150 seconds

Some antibiotics interfere also with the determination of creatinine according to Jaffe method.

For a more comprehensive review of factors affecting this assay refer to the publication of Young D.S.

MATERIAL REQUIRED BUT NOT PROVIDED

1. Basic medical analysis laboratory equipment.
2. Spectrophotometer or Biochemistry Clinical Analyzer

Manufacturer	Expiry date	In vitro diagnostic	Storage temperature	Dematerialized water	Biological risk
Product Reference	See Insert	Batch number	Store away from light	Sufficient for	Dilute with

REFERENCE INTERVALS (2)

Serum or plasma	[µmol / L]	mg/dL
Male	[80-115]	0.9 to 1.3
Female	[53-97]	0.6 to 1.1

Urines	[µmol / kg / 24 h]	mg / kg / 24 h
Male	[124-230]	14 to 26
Female	[97-177]	11 to 20

GFR (Glomerular filtration rate)	mL per minute
Adult < 40 years	120 (100 – 140)
Adult > 40 years	Physiologically decreased approx. 1% every year.

Each laboratory should establish its own normal ranges for the population that it serves.

PERFORMANCES

On Kenza 240TX, 37°C, 505 nm (2 separate reagents) with seric specimens

Detection limit: 4.4 µmol/L (0.05 mg/dL)

Linearity Range: between 22 and 1328 µmol/L (15 mg/dL)

Precision:

Within-run N = 20	*Level 1*	*Level 2*	*Level 3*
Mean (µmol/L)	58.4	141.6	508.9
S.D. µmol/L	1.06	1.86	8.14
C.V. %	1.8	1.3	1.6

Between run N = 20	*Level 1*	*Level 2*	*Level 3*
Mean (µmol/L)	58.4	145.1	514.2
S.D. µmol/L	2.3	5.13	11.8
C.V. %	4.0	3.5	2.3

Analytical sensitivity: approx. 0.018 abs/120 sec for 1 mg/dL (88,5 µmol/L)

Comparison studies with commercially available reagent:
Realised on human specimens (n=123) between 0.41 and 13.6 mg/dL

y = 1.1925x - 0.113 r = 0.9879

Interferences:

Turbidity	Negative interference from 0.220 OD
Ascorbic acid	No interference up to 2500 mg/dL
Total bilirubin	Negative interference from 209 µmol/L
Direct bilirubin	Negative interference from 24 µmol/L
Hemoglobin	Negative interference from 133 µmol/L
Glucose	No interference up to 966 mg/dL

Other substances may interfere (see § Limits)

On-board stability: 2 separate reagents are stable 7 days

Calibration Frequency: 4 days

Make a new calibration when changing reagent batch, if quality control results are found out of the established range and after maintenance operations

REFERENCES

(1) *TIETZ N.W. Text book of clinical chemistry, 3rd Ed. C.A. Burtis, E.R. Ashwood, W.B. Saunders (1999) p. 1241-1245.*
(2) *Clinical Guide to Laboratory Test, 4th Ed., N.W. TIETZ (2006) p. 316-321*
(3) *YOUNG D.S., Effect of Drugs on Clinical laboratory Tests, 4th Ed. (1995) p.3-190 to 3-211*
(4) *Fabiny D. L., et Ertingshausen G., Clin. Chem. (1971), 17, p.696-700.*
(5) *D. Labbé et al., Ann. Biol. Clin. (1996), 54, p. 285 – 298*
(6) *SRM: Standard Reference Material ®*

CALIBRATION (6)

- REF 95015 Multicalibrator: value traceable to SRM967 for quantitative determination in serum/plasma.
- REF 80107 Standard (vial R3):
  - Value traceable to SRM914 for quantitative determination in urines.
  - Value traceable to SRM967 for quantitative determination in serum/plasma.

According to ANSM: 1 zero-point, 1 intermediate level and 1 high level have been used to determine these values.

The calibration frequency depends on proper instrument functions and on preservation of the reagent.

QUALITY CONTROL

- REF 95010 EXATROL-N Level 1
- REF 95011 EXATROL-P Level 2
- REF 95012 Urinary Controls (to be diluted as sample before test)
- ANSM recommends low, medium and high controls
- External quality control program.

It is recommended to control in the following cases:
- At least once a run.
- At least once within 24 hours.
- When changing vial of reagent.
- After maintenance operations on the instrument.

If control is out of range, apply following actions:
1. Prepare a fresh control serum and repeat the test
2. If control is still out of range, use a new vial of fresh calibrator
3. If control is still out of range, use a new vial of reagent and reassay

If control is still out of range, please contact BIOLABO technical support or your local Agent.

PROCEDURE

Manual method

Let stand reagent and specimens at room temperature.

Working Reagent (R1+R2)	1000 µL
Specimen (4)	100 µL

Mix well. Perform kinetic tests at 37°C (verify constant temperature). After 30 seconds read absorbance A1 and exactly 120 sec after read absorbance A2 at 490 nm (490-510) against distilled water. Test tube by tube with water (Blank), calibrator, controls and then assays as specimen

1- Performances with manual procedure and with urines should be validated by user.
2- Kenza applications and other applications proposal are available on request.
3- Calibration: use calibrator or aqueous standard as indicated in §Calibration
4- Specimen: serum, plasma or pre-diluted urines (1+19) in demineralised water before measurement.

CALCULATION (6)

Serum or plasma

$$\text{Result} = \frac{\text{(A2 - A1) Assay} - \text{(A2 - A1) Blank}}{\text{(A2 - A1) Standard} - \text{(A2 - A1) Blank}} \times \text{Standard Concentration}$$

Urines diluted with 1+19:

Multiply the above result by dilution factor 20

GFR (by creatinine clearance determination):

Using 24 h urine and serum creatinine

$$\text{Corrected Creatinine Clearance (mL/min)} = \frac{\text{UCr} \times \text{V} \times 1.73}{\text{SCr} \times \text{BSA}}$$

UCr = Urine Creatinine in mg/dL or µmol/L
SCr = Serum Creatinine in mg/dL or µmol/L
V = Urine volume excreted in mL/min (24 h urine volume/1440)
BSA = Body Surface Area in m^2

OR

Using only serum creatinine (by Cockcroft and Gault formula)

$$\text{Creatinine Clearance} = \frac{140 - \text{age in years} \times 2.12 \times \text{weight in Kg} \times \text{K}}{\text{Serum Creatinine (µmol/L)} \times \text{BSA } (m^2)}$$

K = 1.00 for men or K = 0.85 for women