Test Definition: CITR2

Citrate Concentration, Random, Urine
(Non-Orderable)

Overview

Useful For

Only orderable as part of a profile. For more information see CITRA / Citrate Excretion, Random, Urine.

Diagnosing risk factors for patients with calcium kidney stones

Monitoring results of therapy in patients with calcium stones or renal tubular acidosis

Method Name

Only orderable as part of a profile. For more information see CITRA / Citrate Excretion, Random, Urine.

NY State Available

Yes

Specimen

Specimen Type

Urine

Specimen Required

Only orderable as part of a profile. For more information see CITRA / Citrate Excretion, Random, Urine.

Patient Preparation: Any drug that causes alkalemia or acidemia may be expected to alter citrate excretion and should be avoided, if possible. The patient must avoid laxative use for24 hours prior to collection.
Supplies: Sarstedt 5 mL Aliquot Tube (T914)
Container/Tube: Plastic, 5-mL tube
Specimen Volume: 4 mL
Collection Instructions:
1. Collect a random urine specimen.
2. No preservative.

Specimen Minimum Volume

1 mL

Reject Due To

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Urine	Refrigerated (preferred)	14 days	
	Frozen	14 days	

Clinical & Interpretive

Clinical Information

Urinary citrate is a major inhibitor of kidney stone formation due in part to binding of calcium in urine. Low urine citrate levels are considered a risk for kidney stone formation. Several metabolic disorders are associated with low urine citrate. Any condition that lowers renal tubular pH or intracellular pH may decrease citrate (eg, metabolic acidosis, increased acid ingestion, hypokalemia, or hypomagnesemia).

Low urinary citrate is subject to therapy by correcting acidosis, hypokalemia, or hypomagnesemia by altering diet or using drugs such as citrate and potassium.

Reference Values

Only orderable as part of a profile. For more information see CITRA / Citrate Excretion, Random, Urine.

No established reference values

Interpretation

A low citrate value represents a potential risk for kidney stone formation/growth. Patients with low urinary citrate and new or growing stone formation may benefit from adjustments in therapy known to increase urinary citrate excretion.

Very low citrate levels suggest investigation for the possible diagnosis of metabolic acidosis (eg, renal tubular acidosis).

For children ages 5 to 18, a ratio of less than 0.176 mg citrate/ mg creatinine is below the 5% reference range and considered low.(1)

Cautions

Drugs that lower systemic pH, potassium, and/or magnesium also lower urine citrate and are to be avoided in patients with tendency to form calcium stones. Conversely, drugs that raise systemic pH, potassium, and/or magnesium may raise urine citrate and should be considered when treating patients or interpreting results.

Clinical Reference

1. Srivastava T, Winston MJ, Auron A et al: Urine calcium/citrate ratio in children with hypercalciuric stones. Pediatr Res. 2009;66:85-90
2. Hosking DH, Wilson JW, Liedtke RR, et al: The urinary excretion of citrate in normal persons and patients with idiopathic calcium urolithiasis (abstract). Urol Res. 1984;12:26
3. Lieske JC, Wang X: Heritable traits that contribute to nephrolithiasis. Urolithiasis. 2019 Feb;47(1):5-10
4. Lieske JC, Turner ST, Edeh SN, Smith JA, Kardia SLR: Heritability of urinary traits that contribute to nephrolithiasis. Clin J Am Soc Nephrol. 2014 May;9(5):943-950. doi: 10.2215/CJN.08210813

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Performance

Method Description
Citric acid in the presence of zinc(2+) at pH 8.2 is catalyzed to oxaloacetate by the enzyme, citrate lyase. Oxaloacetate in the presence of malate dehydrogenase and reduced nicotinamide adenine dinucleotide (NADH) is reduced to malate (II). The citric acid concentration in the reaction mixture can be determined by measuring the disappearance of the light-absorbing NADH.(Delaney MP, Lamb EJ: Kidney disease. In: Rifai N, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:1309-1310)

PDF Report
No

Day(s) Performed
Monday through Saturday

Report Available
Same day/1 day

Specimen Retention Time
7 days

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Main Campus

Fees & Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification
This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information
82507

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CITR2	Citrate Concentration, Random, U	2128-7

MAYO CLINIC LABORATORIES

Test Definition: CITR2

Citrate Concentration, Random, Urine
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Result ID	Test Result Name	Result LOINC® Value
CITR2	Citrate Concentration, Random, U	2128-7