Test Definition: SULFU

Sulfate, 24 Hour, Urine

Overview

Useful For

Assessing the nutrition intake of animal protein

The calculation of urinary supersaturation of various crystals or stones

Special Instructions

- Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens

Method Name

High-Pressure Ion Chromatography (HPIC)

NY State Available

Yes

Specimen

Specimen Type

Urine

Necessary Information

24-Hour volume (in milliliters) is required.

Specimen Required

Supplies: Sarstedt 5 mL Aliquot Tube (T914)
Container/Tube: Plastic, 5-mL urine tube
Specimen Volume: 4 mL
Collection Instructions:
1. Collect urine for 24 hours.
2. Collection instructions with **no preservative:**
-**Specimen must be kept refrigerated during and after collection.**
3. Collection instructions **with preservative:**
a. If preservative is **not** added **before** collection, the specimen **must be kept refrigerated until preservative is added**.
b. Preservative must be added **within 4 hours** of the end of collection.
4. Specimen pH should be between 4.5 and 8 and will stay in this range if kept refrigerated. Specimens with pH >8 indicate bacterial contamination, and testing will be cancelled. Do not attempt to adjust pH as it will adversely affect results.
Additional Information: See Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens for multiple collections.

Forms

If not ordering electronically, complete, print, and send a Renal Diagnostics Test Request (T830) with the specimen.

Urine Preservative Collection Options

Note: If the specimen has been refrigerated during the entirety of the collection, the addition of preservative **must occur within 4 hours of completion** of the collection.

Ambient (no additive)	No
Refrigerate (no additive)	Preferred
Frozen (no additive)	OK
50% Acetic Acid	No
Boric Acid	OK
Diazolidinyl Urea	OK
6M Hydrochloric Acid	No
6M Nitric Acid	No
Sodium Carbonate	OK
Toluene	No

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 sulfate is a reflection of dietary protein intake, particularly meat, fish, and poultry, which are rich in sulfur-containing amino acids methionine and cysteine. Urinary sulfate can be used to assess dietary protein intake for nutritional purposes. A protein-rich diet has been associated with an increased risk for stone formation, possibly due, in part, to an increase in urinary calcium excretion caused by acid production from metabolism of sulfur-containing amino acids.(1,2) Indeed, urinary sulfate excretion is higher in patients who have kidney stones than in individuals who do not form stones. Thus, urinary sulfate excretion may provide an index for protein-induced calciuria.(1)

Sulfate is a major anion in the urine that has significant affinity for cations and modulates the availability of cations for reacting with other anions in the urine. It thus is an important factor of urinary supersaturation(3) for various crystals or stones such as calcium oxalate, hydroxyapatite, and brushite. For example, a high sulfate concentration may modulate the availability of calcium for reacting with oxalate and thus affect the propensity for calcium oxalate stone or crystal

formation. Urinary sulfate also has a major impact on buffering or providing hydrogen ions and as such modulates the supersaturation of uric acid.

Reference Values
7-47 mmol/24 hours

Interpretation
Urinary sulfate is a reflection of dietary protein intake, particularly of meat, and thus can be used as an index of nutritional protein intake.

It also is used in the calculation of urinary supersaturation of various crystals or stones.

Cautions
No significant cautionary statements

Clinical Reference
1. Rodgers A, Gauvin D, Edeh S, et al. Sulfate but not thiosulfate reduces calculated and measured urinary ionized calcium and supersaturation: implications for the treatment of calcium renal stones. PLoS ONE. 2014;9(7):e103602. doi:10.1371/journal.pone.0103602
2. Magee EA, Curno R, Edmond LM, Cummings JH. Contribution of dietary protein and inorganic sulfur to urinary sulfate: toward a biomarker of inorganic sulfur intake. Am J Clin Nutr. 2004;80(1):137-142
3. Houterman S, van Faassen A, Ocke MC, et al. Is urinary sulfate a biomarker for the intake of animal protein and meat?. Cancer Lett. 1997;114(1-2):295-296

Performance

Method Description
A high pressure ion chromatography system (HPICS) utilizes an anion exchange column to separate sulfate from other anions present in urine. Detection of sulfate is done by conductivity change as eluent flows through a conductivity cell of a conductivity detector. The Thermo IC system is operated through a PC computer using thermo Chromeleon 7 software.(Christison T, Lopez L. Determination of Inorganic Anions in Acid Rain Using a Dedicated High-Pressure Capillary Ion Chromatography System. Technical Note 124 Thermo Scientific; 2016)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
1 to 3 days

Specimen Retention Time
7 days

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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

84392

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
SULFU	Sulfate, 24 Hr, U	26889-6

Result ID	Test Result Name	Result LOINC® Value
SLF_U	Sulfate, 24 Hr, U	26889-6
TM89	Collection Duration	13362-9
VL71	Urine Volume	3167-4
SUL_C	Sulfate Concentration, 24 Hr, U	12920-5