MAYO CLINIC LABORATORIES

Test Definition: VLTS

Volatile Screen, Serum

Overview

Useful For

Detection and quantitation of acetone, methanol, isopropanol, and ethanol in serum

Quantification of the concentration of ethanol in serum correlates with degree of intoxication

Evaluation of toxicity to the measured volatile substances

Testing Algorithm

This test includes analysis for methanol, ethanol, isopropanol, and acetone.

Method Name

Headspace Gas Chromatography Flame Ionization Detector (HSGC-FID)

NY State Available

Yes

Specimen

Specimen Type

Serum

Additional Testing Requirements

If measurement of ethylene glycol is also needed, order ETGL / Ethylene Glycol, Serum in addition to this test.

Specimen Required

Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial for serum collected in red-top tubes only.
Specimen Volume: Full tube
Collection Instructions:
1. Do not use alcohol to clean arm. Use alternative such as Betadine to cleanse arm before collecting any specimen for volatile testing.
2. Avoid exposure of specimen to atmosphere.
3. Centrifuge serum gel tubes with 2 hours of collection but **do not aliquot**.
4. **Centrifuge red-top tubes** and aliquot serum in plastic vial within 2 hours of collection.

Forms

If not ordering electronically, complete, print, and send a Therapeutics Test Request (T831) with the specimen.

Specimen Minimum Volume

0.5 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Ambient	24 hours	
	Refrigerated (preferred)	14 days	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

Volatile substances in the blood include ethanol, methanol, isopropanol, and acetone. Methanol and isopropanol are highly toxic; toxicity results from ingestion (exogenous). Acetone is generally elevated in metabolic conditions such as diabetic ketoacidosis (endogenous). It also is a metabolite of isopropanol.

Ethanol is one of the most widely abused legal substances in the United States. It is the active agent in beer, wine, vodka, whiskey, rum, and other liquors. Ethanol acts on cerebral function as a depressant similar to general anesthetics. This depression causes most of the typical symptoms such as impaired thought, clouded judgment, and changed behavior. As the level of alcohol increases, the degree of impairment progressively increases.

On average, the serum or plasma concentration of the alcohols is 1.2-fold higher than blood concentration. For example, the serum or plasma would contain approximately 0.10 g/dL of ethanol in a blood specimen that contains 0.08 g/dL ethanol. Due to potential variations in the serum to whole blood ratio, serum should not be used in a medico-legal context. However, in the context of medical/clinical assessment, serum or plasma may be submitted for analysis.

Reference Values

Methanol:
Not detected (Positive results are quantitated.)
Toxic concentration: > or =10 mg/dL

Ethanol:
Not detected (Positive results are quantitated.)
Toxic concentration: > or =400 mg/dL

Isopropanol:

Not detected (Positive results are quantitated.)
Toxic concentration: > or =10 mg/dL

Acetone:
Not detected (Positive results are quantitated.)
Toxic concentration: > or =10 mg/dL

Interpretation

Methanol:
The presence of methanol indicates exposure that may result in intoxication, central nervous system (CNS) depression, and metabolic acidosis. Ingestion of methanol can be fatal if patients do not receive immediate medical treatment.

Ethanol:
The presence of ethanol indicates exposure that may result in intoxication, CNS depression, and metabolic acidosis.

Isopropanol:
The presence of isopropanol indicates exposure that may result in intoxication and CNS depression. Ingestion of isopropanol can be fatal if patients do not receive immediate medical treatment.

Acetone:
The presence of acetone may indicate exposure to acetone; it is also a metabolite of isopropanol and may be detected during ketoacidosis.

Cautions

No significant cautionary statements

Clinical Reference

1. Langman LJ, Bechtel LK, Holstege CP. Clinical toxicology. In: Rifai N, Chiu RWK, Young I, Burnham CD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 43
2. Mayfield J, Mihic SJ. Ethanol. In: Brunton LL, Knollmann BC. Goodman and Gilman's: The Pharmacological Basis of Therapeutics. 13th ed. McGraw-Hill Education; 2022:chap 27
3. Olson KR, Anderson IB, Benowitz NL, et al. Specific Poisons and Drugs: Diagnosis and Treatment. In: Poisoning and Drug Overdose. 8th ed. McGraw-Hill; 2022:section II

Performance

Method Description

Samples are analyzed and quantified by headspace gas chromatography with flame ionization detection.(Baselt RC. Disposition of Toxic Drugs and Chemicals in Man. 10th ed. Biomedical Publications; 2014:2211)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available
1 to 2 days

Specimen Retention Time
2 weeks

Performing Laboratory Location
Rochester

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
80320
G0480 (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
VLTS	Volatile Scrn, S	50025-6

Result ID	Test Result Name	Result LOINC® Value
8632	Volatile Scrn, S	32044-0
30917	Methanol, S	5693-7
30918	Ethanol, S	5643-2
30919	Acetone, S	5568-1
30920	Isopropanol, S	5669-7
34376	Chain of Custody	77202-0