

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

Container/Tube:

Preferred: Serum gel

Acceptable: Red top

Specimen Volume: Full tube

Collection Instructions:

1. **Patient arm must be cleansed with water only.**
2. Avoid exposure of specimen to atmosphere.
3. **Do not aliquot serum gel tubes.**
4. **Centrifuge red-top tubes** and aliquot serum in plastic vial within 2 hours of collection. Send serum aliquot refrigerated.

Forms

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

Reject Due To

Gross hemolysis OK
 Gross lipemia OK
 Gross icterus OK

Specimen Minimum Volume

0.5 mL

Specimen Stability Information

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

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 the single most important substance of abuse 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 which 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 which may result in intoxication, CNS depression, and metabolic acidosis.

Isopropanol:

The presence of isopropanol indicates exposure which 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, Meier BM, Holstege C. Chapter 41: Clinical Toxicology. In: Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. Edited by N Rifai, AR Horvath, CT Wittwer. Sixth edition. Elsevier; 2018. pp. 832-87
2. Mihic SJ, Koob GF, Mayfield J, Harris RA. Ethanol. In: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th edition. Edited by LL Brunton, R Hilal-Dandan, BC Knollmann. McGraw-Hill Education; 2017
3. Olson KR, Anderson IB, Benowitz NL, et al: Specific Poisons and Drugs: Diagnosis and Treatment. In Poisoning and Drug Overdose, Seventh edition. McGraw-Hill Education; 2017

Performance**Method Description**

Specimens are analyzed and quantified by headspace gas chromatography- flame ionization detection.(Baselt RC: Disposition of Toxic Drugs and Chemicals in Man, 10th edition, Biomedical Publications; 2014. pp 2211)

PDF Report

No

Performing Laboratory Location

Rochester

Fees & Codes**Test Classification**

This test was developed, and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test 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	Reporting Name	LOINC®
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