TEST

Methanol test

A methanol test measures the amount of toxic methanol alcohol in a blood sample.

WHAT IT MEASURES
Methanol concentration in blood

SAMPLE
Blood, usually serum or plasma

FASTING NEEDED?
No

HOW LONG IT TAKES
A few minutes for a blood draw

RESULTS IN
Hours to several days, varying by laboratory and urgency

USED FOR
Diagnosing and monitoring suspected methanol poisoning

MAIN LIMITATION
Late testing may miss methanol already converted into toxic formate

Overview

A methanol test measures methanol in the blood. Methanol is a toxic type of alcohol found in some industrial solvents, fuels, antifreeze products, and improperly made or contaminated alcoholic drinks.

The body changes methanol into formate, a chemical that can damage the eyes, brain, and other organs. This process takes time. A person can therefore become seriously unwell even when a later blood test shows only a small amount of methanol.

Most laboratories measure methanol using gas chromatography. This method separates methanol from ethanol and other alcohols before measuring it. The test may be included in a broader "volatile alcohol" or "toxic alcohol" panel.

This is not a routine health screening test.

Why the test is ordered

The test is mainly ordered when methanol exposure or poisoning is suspected. It can confirm

that methanol is present and help the medical team follow how its concentration changes during treatment.

It may be requested after:

Doctors may order other tests at the same time. These can include blood acidity, electrolytes, kidney function, glucose, blood osmolality, ethanol, and tests for other toxic alcohols.

- Swallowing a product that may contain methanol
- Drinking counterfeit, contaminated, or home-distilled alcohol
- A workplace or laboratory exposure
- Blood tests showing unexplained excess acid in the blood
- Symptoms such as blurred vision after a possible toxic alcohol exposure

Who should have the test

You may need testing if there is a reasonable possibility that you swallowed or were significantly exposed to methanol. The decision is based on the product involved, amount, route of exposure, timing, symptoms, and other laboratory findings.

Methanol testing is not usually useful for someone without a known exposure or relevant clinical findings. It is also not a general test for alcohol use.

Possible methanol poisoning is an emergency. Seek urgent help if you may have swallowed methanol, even if you feel well. Symptoms can be delayed. Blurred or reduced vision, severe headache, repeated vomiting, confusion, unusual sleepiness, seizures, or difficulty breathing require emergency assessment. Contact your local emergency service or poison centre rather than waiting for a test appointment.

How to prepare

You do not need to fast. Food, water, and ordinary coffee do not directly affect the methanol measurement.

Tell the medical team:

Bring the product container or a photograph of its label if it is safe to do so. Do not deliberately make yourself vomit or drink alcohol to try to treat the exposure.

For suspected poisoning, do not delay emergency care to prepare for the test.

- When the possible exposure occurred
- What product or drink was involved
- How much may have been swallowed
- Whether ethanol was also consumed
- Whether treatment has already started
- Whether you have had dialysis

What happens during the test

A healthcare professional takes blood from a vein, usually in your arm. A tourniquet is placed around the upper arm, the skin is cleaned, and a small needle is inserted. The collection generally takes only a few minutes.

The laboratory needs to keep the sample tightly sealed because methanol is volatile, meaning it can evaporate. The correct collection tube and handling method depend on the laboratory.

A urine methanol test is occasionally used, but blood is generally more helpful for assessing the concentration currently circulating in the body.

Understanding your results

Results may be reported in milligrams per decilitre, milligrams per litre, or millimoles per litre. Check the units before comparing results from different laboratories.

A result may be reported as:

A detected result supports recent methanol exposure. The concentration must be interpreted alongside the time since exposure, symptoms, blood acidity, ethanol level, treatment, and other test results.

A low or undetectable result does not always rule out poisoning. If testing happens late, much of the methanol may already have been changed into formate. This can leave a low methanol concentration while harmful effects and abnormal blood acidity are still present.

Reference ranges and interpretation vary by laboratory, age, sex, pregnancy status, medicines, and clinical context. Age and sex do not usually cause large changes in the methanol measurement itself, but they may affect the overall assessment. There is no single result that should be interpreted without its units and clinical setting.

- Not detected or below the laboratory's measuring limit
- Detected, with a measured concentration
- Above the laboratory's reportable range

What affects the results

Timing is the most important influence. Soon after exposure, methanol may be present before major changes appear in other blood tests. Later, the methanol concentration may fall as the body converts it into formate.

Several other factors can change the number or make it misleading without a laboratory error:

Meals, coffee, recent exercise, iron deficiency, altered red blood cell turnover, and a recent blood transfusion do not usually change the methanol result. Kidney function does not normally create a false methanol reading, although kidney problems can affect the wider illness and the interpretation of other blood tests.

- Ethanol taken at the same time: Ethanol slows the conversion of methanol into formate. Methanol may remain measurable for longer, while symptoms and blood acidity may be delayed.
- Fomepizole treatment: This medicine also slows methanol breakdown. The blood concentration may fall more slowly even though treatment is protecting the body from further formate production.
- Dialysis: Dialysis can remove methanol and formate quickly, so a sample taken afterward may be much lower than one taken before treatment.
- Sample handling: Methanol can evaporate from an open or poorly sealed tube, potentially producing a falsely low result.
- Testing method: Less specific methods may have difficulty separating methanol from other alcohols. Gas chromatography is better able to distinguish them.
- Different sample types and units: Serum, plasma, whole blood, and urine results are not automatically interchangeable.

Accuracy and limitations

A properly collected blood sample tested by gas chromatography can identify and measure methanol accurately. The test is less likely to say methanol is present when it is not because the method separates different volatile alcohols.

However, no test is perfect. A methanol test can miss clinically important poisoning if the sample is taken late, after dialysis, or after much of the methanol has become formate. Poor sealing or delayed handling may also lower the measured concentration.

False-positive results are uncommon with a well-validated gas chromatography method. They are more possible with less specific laboratory techniques, contamination, or incorrect identification of another volatile chemical.

The test measures methanol, not the amount of formate or the extent of organ injury. Formate testing may be helpful in a late presentation, but it is not widely or rapidly available.

An osmolar gap or anion gap may provide clues while the direct result is pending. These calculated blood-test differences cannot reliably confirm or exclude methanol poisoning by themselves. When exposure is strongly suspected, emergency treatment may begin before a methanol result is available.

Risks and complications

A blood draw may cause brief discomfort, a small bruise, or minor bleeding. Some people feel light-headed or faint during or shortly after the collection.

What happens next

If methanol is detected, the medical team will interpret the result with your symptoms, exposure history, blood acidity, and other laboratory findings. Repeat measurements may be used to follow the concentration during treatment.

Emergency treatment can include medicine that blocks methanol breakdown, treatment of abnormal blood acidity, and dialysis in some situations. Decisions are not based on the methanol number alone.

If the result is negative but suspicion remains high, further observation, repeat testing, or other blood tests may be needed. A late negative result does not safely exclude poisoning on its own.

For a result found outside an emergency setting, arrange routine follow-up with the clinician who ordered the test to discuss the source of exposure and whether repeat testing is needed. Possible recent ingestion, visual changes, confusion, severe vomiting, breathing difficulty, seizures, or marked drowsiness require urgent or emergency care instead of routine follow-up.

Common questions

Can I drink coffee before a methanol test?

Yes. Coffee does not directly change the methanol concentration, and fasting is not normally required. During an emergency assessment, follow instructions from the medical team about eating or drinking.

Does the time of day matter?

No. Morning and evening results are not naturally different. What matters is how much time has passed since the possible exposure and whether treatment has started.

Can I exercise beforehand?

Exercise does not usually affect the result. If poisoning is possible, do not exercise or delay assessment to prepare for the blood draw.

Can drinking ordinary alcohol change the test?

Yes. Ethanol does not usually create a false methanol result, but it slows methanol's conversion into formate and changes how the result is interpreted. Tell the medical team what you drank and when. Never try to treat suspected methanol exposure by drinking alcohol.

Will an alcohol wipe on my skin affect the result?

Routine skin cleaning should not create a methanol result when the sample is collected correctly. Laboratories use suitable collection and handling procedures to prevent contamination and evaporation.

Can I wait for the result before seeking treatment?

Not if poisoning is reasonably suspected. Direct methanol testing may take hours or longer, and symptoms can be delayed. Contact emergency services or a poison centre promptly after a possible ingestion.

Sources

- Agency for Toxic Substances and Disease Registry. Medical Management Guidelines for Methanol .
- National Institute for Occupational Safety and Health. Methanol: Systemic Agent . Emergency Response Safety and Health Database.
- Mayo Clinic Laboratories. MEOH: Methanol, Blood . Test Catalog.



- ARUP Laboratories. Methanol, Quantitative, Serum or Plasma . Test Directory.
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- Kraut JA, Mullins ME. Toxic alcohols. The New England Journal of Medicine . 2018;378:270-280.