

## DRUG TESTING:

# Diabetes, Glucose and Sample Fermentation



**Q.** Our courts are seeing several participants with elevated glucose levels and can't seem to figure out the cause (such as some sort of masking agent). Do you have any insight?

**A.** From a theoretical perspective, there is nothing about diabetes that should cause a false-positive urine alcohol or ethyl glucuronide (EtG) test. In other words, the condition of diabetes does not create ethyl alcohol (ethanol) in the human body. But with that said, there is an uncommon diabetes-related event that could influence a urine alcohol/EtG determination and is accompanied by increases in urine glucose levels.

It is possible for fermentation to occur in the sample cup post-collection if the right chemicals are present, just as in brewing beer or fermenting wine. This fermentation process, of course, produces alcohol. In diabetes, either the body does not produce sufficient insulin or the cells ignore the insulin. Insulin is necessary for the body to be able to use glucose as an energy source—in part, by taking sugar from the blood and transporting it into the cells. When glucose builds up in the blood (instead of going into cells), excess or unabsorbed glucose can end up spilling into the urine, resulting in elevated

urine glucose levels. The excess urine glucose becomes one of the two precursors necessary for the production of alcohol via fermentation. The other precursor is yeast.

The presence of yeast in urine is usually an indication that the participant has an infection. The most common diagnosis associated with urinary yeast production is a urinary tract infection (UTI). Therefore, if a client has a UTI and is an uncontrolled diabetic (spilling glucose into his or her urine), it is possible for the client's urine sample to ferment over time, causing the production of ethyl alcohol in the sample cup post-collection.

The result is a urine specimen that will yield an alcohol-positive result (due to fermentation), even if the client has not consumed alcoholic beverages. The incidence of in-cup fermentation is uncommon—perhaps 1 to 3 percent. It is rare in men; it is more common in females, who can contract vaginal yeast infections.

If alcohol is present in the sample as a result of fermentation, that alcohol can be converted to EtG under certain conditions. This is rare, but possible. However, if the alcohol is present in the sample as a result of fermentation, the fermented alcohol cannot be converted to ethyl sulfate (EtS). Therefore, if your confirmation analysis includes the determination of EtS, that would help you discriminate between potential fermentation and consumption of alcoholic beverages.

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Your laboratory may be able to perform additional analyses to help determine the source of the alcohol present in the sample. For example, ask your laboratory to check the urine for the presence of glucose, and have them check for nitrites. Either or both will be high in cases of post-collection alcohol fermentation—glucose because of the diabetes and nitrites because of the infection. The laboratory could also perform a microscopic examination of the urine to detect whether yeast cells are present.



This project was supported by Grant No. 2016-MU-BX-K004 awarded by the Bureau of Justice Assistance. The Bureau of Justice Assistance is a component of the Department of Justice's Office of Justice Programs, which also includes the Bureau of Justice Statistics, the National Institute of Justice, the Office of Juvenile Justice and Delinquency Prevention, the Office for Victims of Crime and the SMART Office. Points of view or opinions in this document are those of the author and do not necessarily represent the official position or policies of the U.S. Department of Justice.