

MONITORING KETONE AND BLOOD GLUCOSE LEVELS ON A LOW-CARB DIET

By Mary T. Newport M.D. – April 2019

While it is not necessary to measure ketone levels, many people who make the change to a low-carb, ketogenic diet and/or use ketone salts or esters would like to have some positive proof that their ketone levels are, in fact, elevated. When transitioning from a higher carb to a low carb, ketogenic type diet, it can take several days to begin to see an increase in ketone levels and the ketone level may continue to rise for two or three weeks before it levels off. The ketone level can fluctuate throughout the day and can vary considerably from person to person.

Using ketone salts, such as Prüvit Keto Nat or Keto Up, as a supplement can give you a jump start on getting into ketosis and increase ketone levels within 30 to 60 minutes of taking the product. Using coconut oil, MCT oil or a mixture like Prüvit MCT//143 (my formulation with Prüvit) as part of the diet can help increase and sustain ketone levels as well.

There are several ways available to measure ketone levels in urine, blood or by using a breath analyzer:

When blood levels of ketones are elevated (ketosis), the excess ketones will filter out of the blood into the urine. Urine ketone test strips were originally developed for diabetics to help determine if they are going into diabetic ketoacidosis when the blood sugar is elevated. There are many companies that sell urine test strips that change color when ketone levels are elevated – usually the deeper the color, the higher the ketone level. This will not tell you what your actual blood ketone level is but can give you a rough idea of whether you are in ketosis or not. However, one of the drawbacks to using urine test strips is that they only measure the ketone acetoacetate and not betahydroxybutyrate, which tends to be much more elevated than acetoacetate during ketosis. Also, Prüvit ketone salts and Keto-Up, broths and teas contain betahydroxybutyrate rather than acetoacetate. You could have elevated levels of betahydroxybutyrate and this might not be detected by the urine test strip. Some of the urine ketone test strips state on the package that they measure acetoacetate and others do not – consider contacting the manufacturer directly to find out.

A more direct way to measure beta-hydroxybutyrate is by using a blood glucose/ketone monitor with ketone test strips. These monitors were developed for diabetics and come with a lancet holder that pricks your finger and requires only a small drop of blood. The ketone test strips do not detect the ketone acetoacetate, but rather the form of betahydroxybutyrate that is in Keto Nat and Keto Up and in ketone esters currently on the market. The test strips may not pick up the alternative form of betahydroxybutyrate which is common in some of the less expensive, less bioactive racemic ketone salts brands – so you could have elevated levels of betahydroxybutyrate that don't show up on this test. The blood ketone monitors themselves are not very expensive, usually less than \$40 plus cost of strips. Keto-Mojo (www.keto-mojo.com) has the best price for ketone strips (about \$1 each); also, glucose and ketone levels can be monitored using the same meter.

Whenever I test my own blood ketone level, every couple of weeks or so, or when I change my diet or ketone supplements, I have a second monitor set up to test my blood sugar. I like to do this to keep an eye on my fasting blood sugar. A positive health benefit is that fasting blood sugar tends to trend down when transitioning from a higher carb to a low carb, ketogenic diet and with using ketone salts. I set up an inexpensive glucose side-by-side with the ketone meter to use the same drop of blood from one finger stick to test both. Usually as ketone levels increase with diet, the blood sugar trends down. Also, blood sugar can drop rather dramatically within an hour or so of taking an exogenous ketone supplement and take several hours to return to baseline. Check blood ketones just before and 30 and 60 minutes after taking exogenous ketones to determine the peak level and what happens over the next few hours.

Another way to monitor ketosis is by using a ketone breath analyzer, which measures the ketone called acetone. Acetone becomes elevated and is mostly exhaled when you are in ketosis. Like the ketone urine strips, this will give you a rough estimate of how deeply you are into ketosis. The monitor itself is pricey, currently about \$190, but is reusable and you can monitor your level of ketosis as often as you like throughout the day.

The most definitive way, but also the most expensive way, to measure ketone levels is through direct lab testing of blood. Both betahydroxybutyrate and acetoacetate can be measured with these techniques. This kind of monitoring would be most useful in ketone research where very precise levels are important. If you are having other lab work done, you could ask your doctor to include a ketone level.

Is ketone level monitoring necessary? Probably not but could provide positive reinforcement and encouragement to let you know that you are indeed raising your ketone levels from your diet or ketone supplement.

For more information on Prüvit Keto Nat, Keto Up and MCT//143 look at:

<https://marynewport.shopketo.com>

For information on ketone esters, see:

www.KetoneAid.com/MTN (free shipping link)

www.HVMN.com.