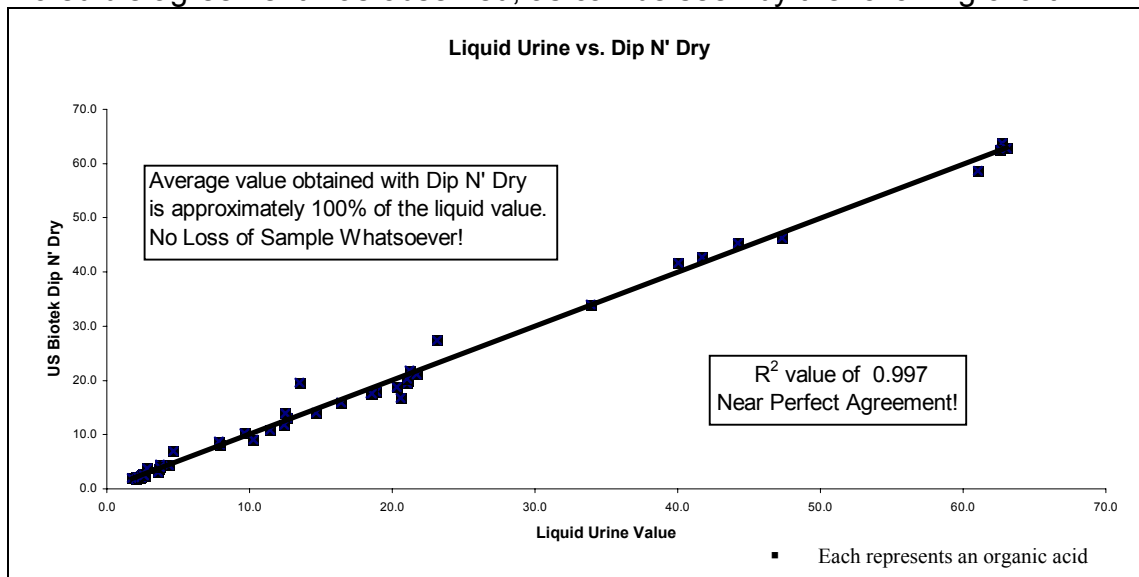


## A Superior Collection Method for Urinary Organic Acid Analysis

Using Gas Chromatography coupled to a Mass Spectrometer (GC-MS) a simple urine test allows for the measurement of a host of organic acids; byproducts of cellular metabolic pathways. Organic acid analysis can be an extremely cost-effective means of monitoring a patient's overall cellular health. Unfortunately, sample instability creates a major obstacle to this analysis when performed on liquid urine specimens, resulting in highly compromised test results. US BioTek has developed a superior means of sample collection to correct this problem.

### **Sample Form – Liquid Urine vs. US BioTek's Dip N' Dry – A Methods Comparison**

An extremely thorough validation of our proprietary Dip N' Dry collection strip was performed by US BioTek. When compared to results from a fresh liquid urine sample, incredible agreement was observed, as can be seen by the following chart.



### Liquid Urine Analysis: A Flawed Method

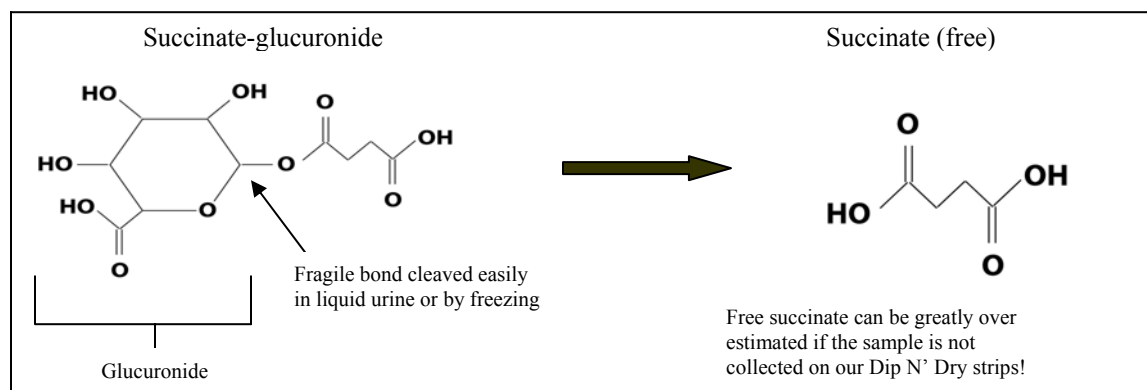
#### PYRUVATE & ALPHA-KETOACID INSTABILITY

- **Considerable degradation of some organic acids is seen from a liquid urine sample.**
  - **Chemical breakdown in liquid specimens can be irregular, unpredictable, and dramatic. This degradation is NOT prevented by the use of ANY preservative!**
- US BioTek's research has revealed considerable chemical instability of these organic acids. When spiked liquid samples were sent to two leading laboratories, alarming results were obtained. Two urine samples were spiked with grossly elevated levels of pyruvate and three alpha-ketoacids. 70% degradation for alpha-ketoisocaproate and complete degradation for alpha-ketoisovalerate was observed in both samples! While in-house measurements confirmed the elevations of these analytes, the competing labs, from the liquid samples, failed to detect these elevations due to degradation before analysis. Pyruvate and other ketoacids showed similar instabilities.

## SUCCINATE INSTABILITY

- **Less than 10% of succinate is “free”. Most exists as a glucuronide conjugate**
- **The succinate-glucuronide bond is easily broken and may falsely elevate results.**

As with pyruvate and the alpha-ketoacids, urinary levels of succinate are very unstable. In liquid urine, free succinate values increase with time. The succinate-glucuronide bond is incredibly fragile and therefore, may result in a falsely elevated succinate value on the test report. The only way to keep this bond from breaking, in liquid urine, is to freeze the sample (and keep it completely frozen until analysis). Ironically though, the freeze/thaw cycle contributes to the problem by increasing free succinate by as much as 20-40%.



Clearly, liquid urine samples have significant chemical instability issues rendering the test results suspect and clinical use ambiguous at best.

### The Solution

- **US BioTek's Dip N' Dry collection strips provide accurate and reproducible results**
- **Organic acids are stable for weeks once dried**
- **Succinate values remain stable and are not falsely elevated**
- **Organic acids are not lost from evaporation or bacterial degradation**

In order for analytes in a urine sample to degrade, a medium is required in which to do so – a liquid medium. By eliminating this medium through dehydration, ALL organic acids on the US BioTek Urinary Metabolic Profile will remain incredibly stable for weeks. US BioTek's research has proven stability & reproducibility to be on par and exceeding that of liquid urine collection when using the Dip N' Dry collection strips. Bacterial effects and chemical instability are eliminated by completely drying the urine sample onto US BioTek's innovative collection strips. This provides for a quick, easy and accurate test.

### **The advantages are clear:**

- Increased analyte stability with the use of the Dip N' Dry collection strip
- Easy processing and shipment via a standard envelope
- No freezing of sample or express shipping required
- A convenient, cost-effective and functionally useful test!

References available upon request.