

# Fabric phase sorptive extraction for cheaper, faster, and more sensitive biological and environmental sampling

June 8 2017, by Jessica Drouet

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Credit: Florida International University

A new method developed at FIU makes toxicological, biological and environmental sampling and testing cheaper, faster, and more sensitive. The new technology, which has been independently validated, promises to disrupt a multi-billion-dollar industry.

Co-inventors Kenneth G. Furton, FIU's provost and executive vice president, as well as a fellow of the National Academy of Inventors, and Abuzar Kabir, an expert in materials chemistry in the College of Arts, Sciences & Education, sought a way to improve the time- and labor-intensive preparation of samples such as blood, urine, milk and water.

"Our intention was to simplify, on every level, the sample preparation process for the benefit of consumers, scientists and the industry," Furton said. "Today's testing methods take significantly longer and are not as sensitive. When analysts are testing for illness, pollutants – or even controlled substances – time and accuracy are critical."

Known as "fabric phase sorptive extraction," the new environment-friendly approach replaces existing techniques for preparing samples. Currently, to test for an illicit drug in urine or a pollutant in lake water, for example, the component to be analyzed must be separated from the sample in a complicated, multi-step process that involves toxic solvents and expensive devices. Depending upon a sample's physical and chemical properties, achieving the required level of component extraction often takes 24 hours or longer, and that time does not include the actual chemical testing.

Using this [method](#), consumers could get the results of blood tests within hours instead of days. Test results for controlled substances in athletes, for example, could come back before competition begins. Quality of drinking water could be more accurately monitored for the presence of cancer-causing and other toxic chemicals.

The new sample preparation material, a composite that uses the same muslin cotton used to make apparel, is the base for their portfolio of new chemical coatings. The team of researchers experimented by applying unique sol-gel coatings to several postage stamp-size swatches and putting them in direct contact with various liquid and air samples.

"We were shocked by the result," Kabir said. "Within 15 minutes, each of the targeted components was extracted in a quantity suitable for analysis. The power, simplicity and benefits of this new sample preparation technique are unprecedented."

The FIU extraction method absorbs a greater amount of a component than commercially available methods and thereby reduces the chances of false negatives and improves the conclusiveness of [test results](#). It also requires the use of little or no solvents, many of which are toxic to the environment.

The university holds a patent on the invention and is currently working to commercialize the technology for widespread use in a variety of applications.

Researchers at more than 30 U.S. and foreign universities have already independently validated the innovation. Those findings have convinced leading experts in the field of chemical testing that the technology should replace existing [sample](#) preparation methods.

Provided by Florida International University

Citation: Fabric phase sorptive extraction for cheaper, faster, and more sensitive biological and environmental sampling (2017, June 8) retrieved 5 July 2024 from <https://phys.org/news/2017-06-fabric-phase-sorptive-cheaper-faster.html>

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