Researchers at the University of South Florida have developed a new method of microbial sample purification using an integrated device that provides simultaneous concentration of a biological target and the removal of background interferences.

Two areas where such a device would be beneficial are in bioreactor systems and in pathogen identification including clinical medicine, environmental analysis, and bioterrorism detection.

Recent advances in technology and molecular biology have allowed the design and use of portable diagnostic devices and biosensors. Such devices can be very accurate and give fast results as compared to using cell cultures. These devices often require high purity or highly concentrated samples which are not always available especially when field testing samples. When integrated into a sensor, our technology can allow for a dirty sample or a sample with low cell concentration, that would previously been unmeasurable, to be rapidly purified, concentrated and analyzed.

This technology can also be used in designing bioreactors. If integrated into a bioreactor, enrichment of the microbe of interest or removal of contaminants can be achieved, optimizing the conditions within the bioreactor and lessening the chances of bio-fouling. The result is a more robust and efficient reactor which saves on cost and time and improves throughput.

**ADVANTAGES:**
- Has an unlimited shelf life and is reusable unlike antibody based separation
- Can be used with a variety of environmental samples
- Can improve the performance of current biosensors
- Can improve the performance of bioreactors by either removing contaminants or enriching microbes

**FISH analysis of activated sludge targeting two different bacteria**

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University of South Florida | Technology Transfer Office
813.974.0994 (office) | 813.974.8490 (fax)
patents@research.usf.edu
http://www.usf.edu/research-innovation/pl/