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Ubiquitous Smartphone Bioluminescence Detection

A simple, inexpensive, smartphone-based hardware/software solution (BAQS) dramatically increases detection sensitivity for quick, on-site environmental surveying and food safety analysis using bioluminescent probes.

Smartphone cameras have uses beyond the usual photos taken for social media apps. There are potential applications in searching for biological matter in environmental surveys and on-site food safety inspections. However, for widespread usage of smartphone-based detection, there is a bottleneck of low sensitivity associated with the sensor of a standard commercial smartphone. Other methods, such as sending actual samples to a laboratory for analysis using high sensitivity detectors, delay the results and impose economic losses in cases of food inspection.

Researchers at Purdue University have developed a smartphone-based device and image processing method to maximize the sensitivity of the typical smartphone camera. The proposed hardware/software combination, named the "Bioluminescent-based Analyte Quantitation by Smartphone (BAQS)," provides a quick, on-site method for analysis of samples tagged with a bioluminescent probe. A structure houses the smartphone, sample, and collection lens, while an algorithm lowers the signal background and enhances the signal from bioluminescent photons.

Advantages:

-Simple & inexpensive

-Achieves large increases in detection

-On-site; no delays in sending samples to labs

Potential applications:

-Environmental surveying

-Food inspection

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Category

Agriculture, Nutrition, & AgTech/Food Safety & Traceability

Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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