



A FIBER OPTIC BIOSENSOR FOR MYCOTOXIN DETECTION IN FOOD SAMPLES

IITM Technology Available for Licensing

Problem Statement

- Ochratoxin A (OTA) is one of the most abundant **food-contaminating mycotoxins** that is also a potential **carcinogen** and responsible for many diseases affecting humans.
- Studies have shown that OTA is a **stable molecule** that can withstand high temperatures, **wide pH range**, and most food processing conditions.
- Consequently, quantifying **OTA detection using a sensing device** is important to ensure high food standards and safety.

Technology Category/Market

- Biosensors (Photonics)
- Biotechnology - Food

Applications - Food safety and quality assurance

Market - The global food safety testing market size was valued at USD 21.1 B in 2022, and is expected to grow at a **CAGR of 8.1 %** to reach USD 31.1 B by from 2027.

Technology

- This invention provides both a method and **label-free, sensitive sensor device** to selectively detect ultra-low concentrations of OTA in food samples.
- The invention is an OTA sensor using a sensing layer of **OTA - specific antibodies (Ab)** encapsulated in ZIF-8 matrix (Ab@ZIF-8), and AuNPs mediated plasmonic transduction properties on a compact **U-bent optical fiber** platform.

- The composite solution is a mixture of **zeolitic imidazolate framework (ZIF-8)** and polyclonal antibody, which was used functionalize the U-bent fiber optic sensor probe to specifically and selectively detect OTA in grape juice.
- The contemporary label-free approach, combining **U-bent optical fiber configuration**, LSPR and antibody-encapsulated ZIF-8, enhanced the performance of the sensor system to achieve a detection limit in the **range of 1.3 fg/ml**.

Intellectual Property

- IN 202141062168
- IITM IDF Ref. **2273**

Key Features / Value Proposition

- The invention is a **dip type**, portable, field deployable, rapid fiber optic sensor for **small molecule analyte detection** which include e.g. drugs, VOCs, carcinogenic dyes in food samples.
- Using the current method for fiber optic probe preparation, a sensor device employing a **LED - photodetector** setup can be developed for the on-field analysis of mycotoxins for rapid analysis.
- The OTA recoveries with the current sensor in commercial samples of coffee and beer were **86.4 - 107%**.

TRL (Technology Readiness Level)

TRL - 4 / 5, Experimentally demonstrated at lab environment

Research Lab

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