

## Multiple mycotoxins determination via immunoassay in agro-food and feed

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Mycotoxins with strong carcinogenesis and toxicity are fatal threats to human and animal health. Rapid assay and arbitration method are important to monitor the mycotoxin contamination of food and feed. In fact, it is frequently found the co-occurrence of mycotoxins in food and feed, requiring rapid detection for multi-mycotoxins. Based on the home-made monoclonal antibody and nanobody, the rapid multi-mycotoxin detection methods were introduced, allowing the highly specificity, sensitivity and high throughput. First, gold nanoparticle was employed in typical test strip to determine single or multi-mycotoxins (as aflatoxin B1, zearalenone, and ochratoxin A), allowing a rapid screening with the aid of a portable grayimaging reader. Also, gold nanoparticle was introduced in the homogeneous turn-on assay for aflatoxin B1 based on binding triggered DNA hybridization/dissociation. Secondly, the Eu-microsphere or quantum dot-microsphere were employed in the rapid assay for the multiple mycotoxins. Based on the Eu-microsphere, the time-resolved fluorescence immunoassay (TRFIA) was established for single or multi-mycotoxins detection. Aflatoxin M1 in raw milk, for an example, could be detected with absence of any sample preparation in 6 min, allowing ultra-lower limit of detection. TRFIA was also employed to detect multi-mycotoxin/pesticide (aflatoxin B1, zearalenone, and chlorothalonil) within 12 min. Quantum dotmicrosphere was conducted for the single or multi-mycotoxin, improving sensitivity and the linear range. All these methods depend on the antibodies and nanoparticle labels, allowing considerable detection limits, working ranges, recoveries, precision, repeatability, and reproducibility. Real agro-food and feed samples were further used to validate these method. It could suggest that these practical methods would be extensively employed to monitor agro-food and feed safety.

*Keywords: rapid assay; arbitration method; mycotoxin; food and feed safety*