

Advances in biosensor based analysis of food contaminants

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The range of chemicals that contaminate our food chain is extensive and expanding. Affordable methods of detection for these contaminants are required to assure the quality and safety of various food products.

Many physicochemical instruments of analysis, while sophisticated, are expensive to purchase and maintain, have a low sample throughput and require a considerable amount of operator training and experience.

Biosensors are devices that utilise a biological sensing element connected to a transducing system which converts a specific biological recognition event into an electronic signal.

A number of different sensing elements are employed that measure different types of activity; the most commonly used being enzymes, cells, receptors, and antibodies. Different types of transducer can also be employed (electrical, acoustic and optical) and these categorise the biosensor into its technology format. The development of these and other technologies has come to an advanced stage and biosensors have become invaluable as user friendly instruments that allow the rapid detection of analytes including small molecules.

Since the use of biosensors for food analysis began advances have been made with respect to the chemistry used for ligand immobilisation, the micro-fluidic systems for liquid handling, analysis of generated data and the integration and automation of instrumental components. An overview of recent advances, such as the use of multi-array to allow multiplexing and the miniaturisation of instrumentation to portable devices, will be given.