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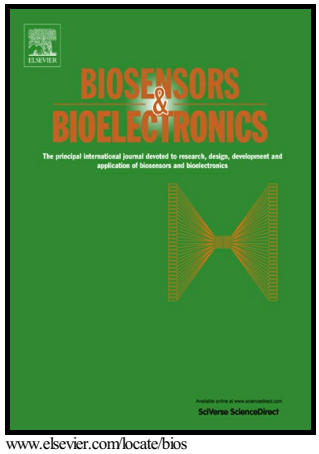

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Comparing nucleic acid lateral flow and electrochemical genosensing for the simultaneous detection of foodborne pathogens

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Abstract

Due to the increasing need of rapid tests for application in low resource settings, WHO summarized their ideal features under the acronym ASSURED (Affordable, Sensitive, Specific, User-friendly, Rapid & Robust, Equipment-free, Delivered to those who need it). In this work, two different platforms for the rapid and simultaneous testing of the foodborne pathogens *E.coli O157:H7* and *Salmonella enterica*, in detail a nucleic acid lateral flow and an electrochemical magneto genosensor are presented and compared in terms of their analytical performance. The DNA of the bacteria were amplified by polymerase chain reaction using a quadruple-tagging set of primers specific for *E. coli eaeA gen* (151 bp) and *Salmonella enterica yfiR gen* (375 bp). During the amplification, the amplicons were labelled at the same time with biotin/digoxigenin or biotin/fluorescein tags, respectively. The nucleic acid lateral flow assay was based on the use of streptavidin gold nanoparticles for the labelling of the tagged amplicon from *E. coli* and *Salmonella*. The visual readout was achieved when the gold-modified amplicons were captured by the specific antibodies. The features of this approach are discussed and compared with an electrochemical magneto genosensor. Although nucleic acid lateral flow showed higher limit of detection, this strategy was able to clearly distinguish positive and negative samples of both bacteria being considered as a rapid and promising detection tool for bacteria screening.

Keywords:

Nucleic acid lateral flow, electrochemical magneto genosensing, foodborne bacteria, simultaneous detection, magnetic particles