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# Microbial biosensing of ciprofloxacin residues in food by a portable lens-free CCD-based analyzer

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## Abstract

We present a rapid and simple approach for sensitive detection of antibiotic residues in food samples, based on luminescence induction by live bacterial sensor strains, integrated into a CCD-based lens-free optical analyzer (LumiSense). Using ciprofloxacin as a model antibiotic, we demonstrate response times of between 20 to 80 min, and detection thresholds of 8 ng/mL for milk, egg white and chicken extract, and 64 ng/mL for egg yolk. These values are below the minimal allowed values as defined by European Union regulations. While not intended to replace traditional analytical equipment and regulation-approved methodologies, LumiSense and similar systems, sample preparation for which involves only simple mixing, dilution and homogenization, may nevertheless provide a simple means for high-throughput food sample screening.

**Keywords:** antibiotics, food, biosensors, bioluminescence, lens, free CCD, milk, eggs, chicken extract.

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