

## Development of a Novel Genetically Modified Bioluminescent Bacteria-Based Assay for Detection of Fluoroquinolones in Animal Derived Foods (Abstract)

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### ABSTRACT

Fluoroquinolones (FQNs) are broad-spectrum antibacterial agents widely used in animal husbandry and aquaculture. The residues and antimicrobial resistance of such antibiotics are the major public health concern. In order to realize multi-analyte detection of FQN residues, a genetically modified bacterium, *E. coli* pK12 harboring plasmid pRecAlux3, was constructed in this study to develop a bioluminescent bacteria-based assay (BLBA) for the detection of FQNs in animal derived foods. This assay was based on the principle of induction of SOS response by FQNs via inducing the *recA* promoter-fused luciferase reporter gene existing on the plasmid pRecAlux3. *E. coli* pK12 was able to recognize 11 FQNs, including difloxacin, enrofloxacin, ciprofloxacin, sarafloxacin, norfloxacin, danofloxacin, ofloxacin, pefloxacin, lomefloxacin, marbofloxacin and orbifloxacin. This method could be applied to 11 edible tissues, including milk, fish muscle, the muscles, livers and kidneys of cattle, chickens and pigs, with very simple and rapid sample extraction procedure using only phosphate-buffered saline. The limits of detection of the FQNs were between 12.5 and 100  $\mu\text{g kg}^{-1}$ , all of which were lower than the maximum residue limits. Most of the recoveries of FQNs were in the range of 60 to 120% and the inter-assay coefficients of variation were less than 30%. This method confirmed by HPLC is reliable and can be used as both screening test and semiquantitative assay, when the identity of a single type of FQN is known.

**Keywords:** Fluoroquinolones (FQNs), Animal Derived Foods, bioluminescent bacteria.

