

Immunoassay to detect residual fluoroquinolone-type antibiotics in food

CSIC has synthesized improved haptens to generate antibodies to fluoroquinolone-based antibiotics for determining their residues in food. The immunoassay is fast and efficient, has detection limits of 0.025-6 ppb depending on the fluoroquinolone, matrix and animal species and detects fluoroquinolones undetectable with other methods.

An offer for Patent Licensing and/or R+D collaboration

Sensitive fluoroquinolone antibiotics quantification system

Quinolone-type antibiotics are used during the production of food from animal origin. Maximum residue limits have been set up by the European Union (Regulation EC 90/2377/EC) and the FDA depending on both the matrix and the animal species.

Current methods for its determination, mainly based on HPLC and GC-MS, although sensitive are labour-intensive. Thus, an immunochemical method is presented based on the use of monoclonal and polyclonal antibodies having broad specificity for fluoroquinolone (FQ) antibiotics. This competitive indirect ELISA can detect a family of 10 fluoroquinolone compounds in milk with limits of detection between 0.025 and 6 ppb, far below MRLs established in the EU. It is noticeable that flumequine, not detected by other immunoassays, is detected at 0.25 ppb and oxolinic acid at 6.01 ppb.

This method has been tested in different immunoassay formats (ELISA microplates, strips, biosensors) and can be applied to different matrix species without the interference of other antibiotics and with better detection limits than chromatographic methods and other immunoassays described.



Detection of fluoroquinolone residues in several matrixes, such as meat, fish, egg or milk

Main advantages and applications

The main features of the developed technique are:

- Specificity. Cross-reactivity with other non-fluoroquinolones based antibiotics is negligible.
- High sensitivity. Limit of detection far below MRLs established in Europe. Examples, in milk, ciprofloxacin: 0.16 ppb, enrofloxacin: 0.08 ppb, flumequine: 0.22 ppb, norfloxacin: 0.03 ppb, danofloxacin: 1.71 ppb.
- The system is easy to use, rapid (less than 10 min), cheap and labour-saving, the most suitable method for rapid screening of fluoroquinolone residues in the veterinary field. FQ can be directly analyzed in milk without any previous extraction or pre-concentration, which is required in the current analytical methods (GC and HPLC).
- In situ application. Special facilities are not required.
- Simultaneous analysis of multiple samples (HTS).
- Haptens for production of antibodies have been designed to conserve all the epitopes characteristic of fluoroquinolones, maximizing their exposition to the immune system.

Patent Status

International PCT application filed

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