QUANTITATIVE DETERMINATION OF VETERINARY DRUG RESIDUES IN EGGS BY UPLC-MS/MS USING A SIMPLE, RAPID AND EFFECTIVE CLEANUP APPROACH

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INTRODUCTION

Veterinary drugs are mainly used in chicken farms to control diseases or laying hens. Generally, these compounds could be transferred and accumulated in eggs. The presence of veterinary drugs in eggs has a potential health risk for the consumers, because they can provide allergic reactions or induce organ pathogenesis to antibiotics used in human medicine[1].

IMPLEMENTATION

Spotlights represent the veterinary drugs from twelve classes, which have their MRLs established in USA, EU and/or China. These classes of veterinary drugs studied in this study are shown in Table 1. This presents the structures of a subset of the veterinary drugs studied.

The most difficult task for the determination of veterinary drug residues is the small sample size. Residue may be lost in the deproteinization and have different physicochemical properties. Therefore, two main strategies are proposed in this work for preparing veterinary drugs and proteins and simultaneous extraction of several classes of veterinary drugs. In this work, sample extraction, cleanup and analysis methods were developed for tandem LC/MS determination of a wide variety of veterinary drugs in eggs.

RESULTS AND DISCUSSION

Evaluation of the Oasis PRIME HLB cartridge was used for the recovery and phospholipids removal effect using egg samples. To evaluate the cartridge recovery for selected veterinary drugs, two types of solutions were used: standard solutions of three concentration levels (0.4MRL, MRL, 2MRL) and the blank egg extracts. As shown in Table 3 and Figure 3, the Oasis PRIME HLB cartridge provided high recovery (~100%) for most of target compounds in egg extracts except for lasalocid A (<10%). The repeatability results are acceptable (RSD<20%) for all compounds.

For each veterinary drug we chose one major component to analyze in this study.

Sample preparation

This method was developed based on the previous method[4].

The Oasis PRIME HLB cartridge was evaluated with respect to recovery for laflufenic acid. The repeatability results are acceptable (RSD<20%) for all compounds.

METHODS

Standards and solutions

Seventeen veterinary drugs from different classes were chosen in this study. A list with their formula, MRLs, and PRs established in USA, EU or China is shown in Table 4. Individual veterinary drug stock solutions (mg/mL) of bacitracin A (1mg/mL) were prepared in methanol or water, except for oxolinic acid and was dissolved in 0.5M NaOH solution. A fixed stock was made by mixing all the individual stock solutions. These solutions were kept at 4°C under darkness.

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