

Screening of beta-agonists in bovine hair using Molecular Imprinted Polymers (MIPs) and LCMS

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Introduction

Beta-agonists are used for growth promotion in cattle. Within the European Union its use, however, is banned. Subsequently beta-agonists analysis is included in regulatory control and monitoring programs focusing on the detection and identification of residues.

In the past MIP extraction columns have been used for analysis of beta-agonist in urine, liver and meat. The availability of a multi-analyte multi-matrix extraction method is essential for the development of rapid and efficient analytical procedures. Nowadays, the molecular imprinting approach is a good one since highly selective MIP materials are available.

The primary advantages of hair analysis relative to urine, blood, saliva, and other traditional testing media is an expanded retrospective "window of detection". For example, where cocaine and its metabolites can only be reliably detected in urine for 48 to 72 hours, hair samples can reveal exposure for several months prior to the time a specimen is collected.

Experimental

A LC-MS screening method for the analysis of 12 beta-agonists in bovine hair was developed. Hair samples were washed, grinded, spiked with (deuterated) internal standards and extracted with methanol. The acidified methanolic extract is washed with heptane and brought, after pH adjustment, onto a preconditioned MIP extraction column. After washing, the column is eluted with 10% acetic acid in methanol. For the detection a Thermo LCQ-Classic ion trap mass spectrometer equipped with an APCI+ interface was used.

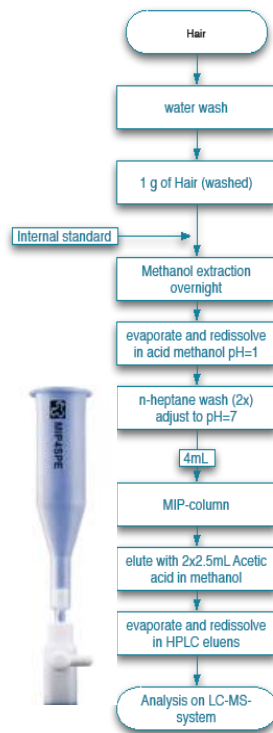
Screening

The samples were obtained within the Dutch National Surveillance program. Nearly 100 samples were analyzed in duplicate whereby the duplicate sample was spiked at a level of 3 ppb for quality control reasons.



Procedure

Extraction and cleanup:



Conclusions

A LC-MS screening method for the analysis of beta-agonists in bovine hair was developed and tested. The method is applicable at low concentrations. The MIP extraction columns used are very robust.

The method was applied to 100 samples bovine hair from the Dutch National surveillance program. No non-compliant samples were found.

Future work:

Extension of the method with more beta-agonists and finalizing the validation according to Commission Decision 2002/657/EC.

