

LC-MS/MS method for the determination of hormones: Validation, application and health risk assessment in various bovine matrices

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Abstract

A new method, using liquid chromatography coupled to mass spectrometry (LC-MS/MS) for the detection of fourteen natural and synthetic hormones in muscles, was validated in other bovine matrices (liver, kidney, bile and hair) according to the Decision Commission 2002/657/EC. As result, this method demonstrates good linearity ($R^2 > 0.99$) as well as accuracy with coefficients of variation for repeatability and reproducibility lower than 23%. Moreover, the values of decision limit ($CC\alpha$) and detection capability ($CC\beta$) were determined indicating values ranging from 0.13 to 0.86 $\mu\text{g}/\text{kg}$ and 0.25–1.72 $\mu\text{g}/\text{k}$ for the majority of analytes. Recovery rate in the different matrices varied from 51.5 to 107%. Indeed, this method has been successfully applied to detect anabolic hormones in eighty-eight samples (muscle, liver, kidney, and bile) collected from different local slaughterhouses. Results showed that progesterone was found in 30 samples at concentrations ranging from 0.11 to 11.7 $\mu\text{g}/\text{kg}$, while testosterone was detected in 34 samples at concentrations ranging from 0.5 to 9.52 $\mu\text{g}/\text{kg}$. All bile samples contain epi-testosterone at concentration ranging from 0.89 to 280 $\mu\text{g}/\text{kg}$. These obtained data were used to calculate the estimated daily intake, hazard quotient and hazard index as exposure assessment.