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UHPLC-MS/MS analysis of thyreostats in serum

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Thyreostats are thioamide antithyroid drugs. Activity of these compounds consists in inhibiting the synthesis of thyroid hormones triiodothyronine (T3) and thyroxine (T4), which favors the processes of animal fattening. Increase in weight of animals is mainly due to the water retention in the tissues and the gastrointestinal tract. The consequence is not only the production of lower meat quality, but also the risk of drug residues to human health. According to the International Agency for Research on Cancer, some compounds of this group possess carcinogenic and teratogenic properties. In accordance with the Council Directive 96/23/EC thyreostats belong to the group A2 - compounds with anabolic properties, which must be controlled on slaughter animals. To extend the range of methods used in the national control plan, a fast and efficient UHPLC-MS/MS method was developed and validated to detect five thyreostatic compounds: tapazole, thiouracil, methylthiouracil, propylthiouracil and phenylthiouracil in bovine serum. Previously published method of thyreostats in urine was used as a starting point for the development of our method. Thyreostats were extracted from serum samples with diethyl ether after derivatization with 3-iodobenzylbromide in basic medium (pH 8.0) and analyzed by gradient elution within 7.5 min on a SB-C18 column (50 x 2.1 mm; 1.8 µm, Agilent) using a mobile phase consisting of acetonitrile/0.1% acetic acid. The analysis was performed on UHPLC Shimadzu NEXERA X2 with triple quadrupole MS 8050 instrument operating in positive electrospray ionization mode. The procedure was validated according to the Commission Decision 2002/657/EC requirements. The recovery and repeatability satisfy the performance criteria specified in this document for banned compounds. The recovery ranged from 97.5% to 113.5% for all examined compounds, and the repeatability did not exceed of 14.1%. The decision limits (CCα) did not exceed 3.95 µg L^{-1}, and also detection capabilities (CCβ) did not exceed 6.73 µg L^{-1}. The developed procedure is sensitive and robust, and therefore, useful for quantification and confirmation of thyreostats in residue control programme.

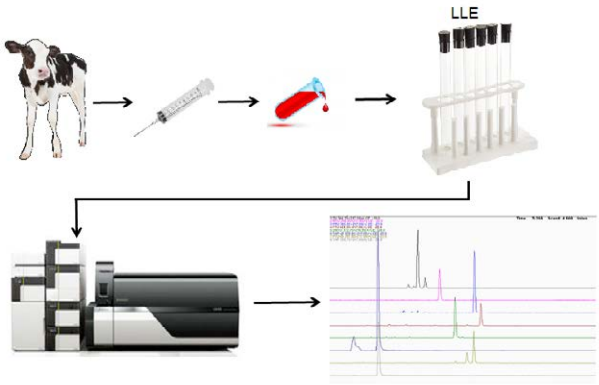

Fig.1: Graphical scheme of determination thyreostats in serum.

Biography

Sebastian Witek works at National Veterinary Research Institute, Poland since 2009. He deals with residues of hormones and thyreostats in biological samples of animal origin. He has a lot of experience in LC-MS/MS and GC-MS.

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