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## NEW APPROACH BASED ON IMMUNOCHEMICAL TECHNIQUES FOR MONITORING OF SELECTIVE ESTROGEN RECEPTOR MODULATORS (SERMS) IN HUMAN URINE

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### Highlights

- A class-selective antibody for the determination of the main metabolites of selective estrogen receptor modulators (SERMS) is presented
- The ELISA developed achieved the analysis of SERMS metabolites with a LOD of 0.15, 0.16 and 0.63 µg/L for 4OH-tamoxifen, 4OH-toremifen and 4OH-clomifen, respectively, much lower than the MRPL established by WADA (20 µg/L).
- The hapten design has been demonstrated as a powerful tool to produce antibodies with tailored properties as has been demonstrated for the simultaneous determination of the main metabolites of SERMs.

### Abstract

Antiestrogenic compounds such as tamoxifen, toremifen and clomifen are used illegally by athletes to minimize physical impacts such as gynecomastia resulting from the secondary effects of anabolic androgenic steroids, used to increase athletic efficiency unlawfully. The use of these compounds is banned by the World Anti-Doping Agency (WADA) and controls are made through analytical methodologies such as HPLC-MS/MS, which do not fulfil the sample throughput requirements. Moreover, compounds such as tamoxifen are also used to treat hormone receptor-positive breast cancer (ER+). Therapeutic drug monitoring (TDM) of tamoxifen may also be clinically useful for guiding treatment decisions. An accurate determination of these drugs requires a solid phase extraction of patient serum followed by HPLC-MS/MS. In the context of an unmet need of high-throughput screening (HTS) and quantitative methods for antiestrogenic substances we have approached the development of antibodies and an immunochemical assay for the determination of these antiestrogenic compounds. The

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