

Rapid and reliable quantification of six antipsychotic drugs in serum Alan Rowe¹, Jing Lianyan² and Li Guoqing² ¹SCIEX, Redwood City, CA, USA; ²Shanghai, China

Background/Introduction:

Antipsychotics, also referred to as neuroleptics, a class of psychotropic drugs commonly prescribed to treat a wide range of psychotic disorders, work by altering the brain chemistry to help manage and relieve psychotic symptoms anxiety, serious agitation, violent or disruptive behavior and mania symptoms. Here we introduce a rapid and efficient extraction method in combination with the QTRAP 4500 system as a comprehensive and sensitive quantitative solution for high-throughput detection of six antipsychotic drugs in serum.

Methods:

A total of six antipsychotic drugs (amisulpride, parlipidone, citalopram, risperidone, olanzapine, clozapine) were targeted in this workflow. They were extracted from 50 μ L spiked serum samples using a protein precipitation procedure. Analytes were separated using an XDB C18 LC column (50 \times 4.6 mm, 1.8 μ m) held at 50°C. Mobile phase A and mobile phase B consisted of ammonium formate in water and acetonitrile, respectively. The injection volume was 3 μ L and the total LC runtime was 3 minutes. MS and MS/MS data were acquired using positive electrospray ionization on the QTRAP 4500 system.

Results:

A series of serum samples spiked with the six drugs were injected at six concentration levels ranging from 2 to 2000 ng/mL to assess the quantitative performance of the developed method. Excellent linearity was observed across the concentration ranges analyzed with R² values greater than 0.99 for each of the six analytes. The efficiency of the sample preparation procedure used in this study was investigated by calculating drug recoveries at two calibration levels. The sample preparation procedure used in this experiment demonstrated excellent recoveries with values ranging between 88.46% and 93.26%. The measurement reproducibility was also investigated at the same two concentration levels for each of the six analytes. The %RSD values ranged from 1.35% and 4.84%, demonstrating the high level of reproducibility of the method.

Conclusion:

A comprehensive workflow for the detection of six antipsychotic drugs in serum is described. The combination of an efficient sample preparation procedure and a fast and robust acquisition method enabled accurate detection of the antipsychotic drugs in serum samples. The optimized LC conditions resulted in separation of the drugs in a 3-minute runtime while the use of the MRM workflow enabled sensitive and accurate quantification of the six antipsychotic drugs across six calibration levels. The protein precipitation procedure for sample preparation demonstrated high recovery levels for the 6 antipsychotic drugs targeted in this workflow. In addition, the robustness of the developed workflow enabled reproducible and sensitive quantification of the six targeted antipsychotic drugs in serum, making this method compatible with the high-throughput requirements of modern forensic laboratories.