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Laser diode thermal desorption/atmospheric pressure chemical ionisation tandem mass spectrometry for quantitative analysis of pharmaceutical compound in plasma

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The development of new drugs is a long process that requires multiple steps. Among these steps, in vitro and in vivo studies both in animals and in human are essential in order to understand the behavior of a new compound in human. Generally, biological fluid such as blood, plasma or urine is collected for the quantitative analysis of new compound. Liquid chromatography tandem mass spectrometry (LC-MS/MS) method is often used for this purpose owing to its selectivity, sensitiviy and high precision. During the last decade, several rapid alternative techniques that eliminates the use of liquid chromatogrpahy part have been introduced in order to increase the sample throughput. Recently, a novel sample introduction method, the laser diode thermal desorption/atmospheric pressure chemical ionization coupled to tandem mass spectrometry (LDTD/APCI-MS/MS) has been applied to the analysis of hormones in wastewater [1]. The aim of this presentation is to discuss the quantification of one of our compound currently under clinical trial in human plasma with simple sample preparation (μ-elution solid phase extraction) followed by LDTD/APCI-MS/MS analysis. Several points which includes the sample preparation, the laser parameter optimisation as well as the method validation by evaluating selectivity, linear range, matrix effect, carry-over and precision (inter- and intra-day) will be covered. In addition, the applicability of the method to clinical sample will be discussed. To this end, a comparison of LDTD APCI-MS/MS technology and classical LC-MS/MS assay has been carried out. In conclusion, our work demonstrates that LDTD/APCI-MS/MS could be used for fast, effective and reliable quantitative analysis of pharmaceutical compounds with reduced cost and by eliminating the chromatography step used in traditional LC-MS/MS.