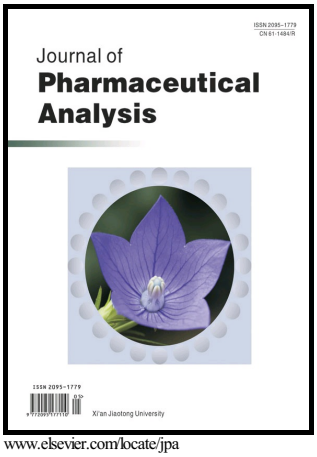

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Comparison of ESI- and APCI-LC-MS/MS methods: A case study of levonorgestrel in human plasma

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Abstract

Electrospray ionization (ESI) and atmospheric pressure chemical ionization (APCI) techniques for liquid chromatography-tandem mass spectrometry (LC-MS/MS) determination of levonorgestrel were evaluated. In consideration of difference in ionization mechanism, the two ionization sources were compared in terms of LC conditions, MS parameters and performance of method. The sensitivity for detection of levonorgestrel with ESI is 0.25 ng/mL which is higher than 1 ng/mL with APCI. Matrix effects were evaluated for levonorgestrel and internal standard in human plasma, and the results showed that APCI source appeared to be slightly less liable to matrix effect than ESI source. With an overall consideration, ESI was chosen as better ionization technique for rapid and sensitive quantification of levonorgestrel. The optimized LC-ESI-MS/MS method was validated for a linear range of 0.25-50 ng/mL with a correlation coefficient $\geqslant$0.99. The intra- and inter-batch precision and accuracy were within 11.72% and 6.58%, respectively. The application of this method was demonstrated by a bioequivalence study following a single oral administration of 1.5mg levonorgestrel tablets in 21 Chinese healthy female volunteers.

Keywords: Levonorgestrel; Ionization modes; LC-MS/MS; Pharmacokinetics; Human plasma

1. Introduction