

**4<sup>th</sup> World Congress on**  
**MEDICINAL PLANTS & NATURAL PRODUCTS RESEARCH AND**  
**12<sup>th</sup> GLOBAL ETHNOMEDICINE & ETHNOPHARMACOLOGY CONFERENCE**  
**August 08-09, 2018 Osaka, Japan**

**Development and validation of UPLC-ESI-Q-TOF method for rapid and accurate screening and quantification of toxic pyrrolizidine alkaloids in medicinal plants**

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Pyrrolizidine Alkaloids (PAs) are secondary metabolites biosynthesized in plants and are found in about 6,000 plants. Among these, the 1, 2-unsaturated PAs, reported to be widely present in medicinal plants belonging to Asteraceae, Boraginaceae and Fabaceae cause hepatotoxicity and genotoxicity in humans and animals. Hence, there is a need for an analytical method that allows these dangerous plant toxins to be determined. In this study, we developed a method that can be used for the rapid and accurate determination of nine toxic PAs in medicinal plants using Ultra-Pressure Liquid Chromatography-Electrospray Ionization-Quadrupole-Time-of-Flight Mass Spectrometry (UPLC-ESI-Q-TOF). The compounds were eluted onto a C18 column with 0.1% formic acid and acetonitrile and separated with good resolution within 11 minutes. Each component was characterized by its precursor ions (generated by ESI-Q-TOF) and fragment ions (produced by Collision-Induced Dissociation, CID) which were used as a reliable database. The proposed analytical method was verified with reference to the ICH guidelines. The results showed excellent linearity ( $R_2 > 0.9951$ ), limit of detection (2 to 12 ng/mL), limit of quantification (6 to 30 ng/mL), intra-day and inter-day precisions and extraction recovery rates (76.9% to 103.3%) for all components. The validated UPLC-ESI-Q-TOF method was applied to medicinal plants belonging to the family Asteraceae and senkirkine and senecionine were detected in *Tussilago farfara*. In addition to the extraction efficiency of these two alkaloids, the QuEChERS method was the most efficient in comparison with methods like hot water and ethanol. The present results demonstrate that the proposed UPLC-ESI-Q-TOF method can be employed for the screening and quantification of toxic alkaloids in medicinal plants.

**Biography**

Jeong Won-Tae is a doctoral student at Chung-buk National University in Republic of Korea. He doubles as staff of Chung-buk National University Tobacco Smoke Analysis Center in Republic of Korea.

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