Simple and Rapid Method for Underivatized Analysis of Glyphosate Residues in Tea (*Camellia sinensis*) Using LC-MS/MS Detection

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Tea (*Camellia sinensis)* is among the most popular beverages around the world. The use of pesticides to abate the frequent attacks on tea plants by pests and invasion by weeds, which pose a threat to the growth and nutrition of tea plants, has become a crucial part in the tea industry and has increased over the years. Glyphosate belonging to the broad-spectrum herbicide category is the most widely used herbicide in the local tea industry. Due to the unavailability of an accurate method, the health risk arising from Glyphosate residues left on dried tea leaves being transferred to tea infusions has been overlooked. This study presents the validation data of an accurate and precise method developed for quantitative analysis of Glyphosate residues in tea using liquid chromatography-tandem mass spectrometry (LC-MS/MS). Glyphosate residues in tea were extracted using water and chloroform. The extracted samples were analyzed using liquid chromatograph coupled to tandem mass spectrometer (LC-MS/MS). Chromatographic separation was achieved on an Atlantis T3 column with isocratic elution. Glyphosate was detected with electron spray ionization (ESI) in negative polarity using multiple reaction monitoring (MRM) transitions. Accuracy evaluated based on recoveries obtained for samples fortified at three concentration levels: low mid and high, covering the working range of the method were within 92%–100%. Precision measured in terms of repeatability and reproducibility expressed as percentage relative standard deviation was below 6%. Detection limit and quantification limit of the method were 1.1 mg/kg and 1.8 mg/kg respectively. The method had a wide linear working range of 1.25–100 mg/kg with correlation coefficient greater than 0.999 over six calibration levels. The method developed in the present study is in compliance with international validation guideline requirements, and is accurate and reproducible enabling simple, rapid and underivatized analysis of Glyphosate residues in tea.

Keywords: Glyphosate, Tea, Method validation, LC-MS/MS

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