

2nd International Conference on

Food Safety and Regulatory Measures

June 06-08, 2016 London, UK

Determination of chromium (III) and chromium (VI) in mainstream cigarette smoke by high performance liquid chromatography - inductively coupled plasma mass spectrometric

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In order to evaluate toxicological properties of chromium in mainstream cigarette smoke a high performance liquid chromatography and inductively coupled plasma mass spectrometric (HPLC-ICP-MS) method was developed for the determination of chromium species, including Cr (III) and Cr (VI) in mainstream cigarette smoke. Particulate matter (PM) and vapor phase matter of mainstream cigarette smoke were trapped by a Borgwaldt kc RM20H rotary smoking machine with an electrostatic trap, and the sample was extracted by sodium ethylene diamine tetracetate (0.1 mmol·L⁻¹, pH=6.0). then the extracting solvent was heated at 60°C holding two hours, at last Cr (III) and Cr (VI) were determined by HPLC-ICP-MS. The detection limits of Cr (III) and Cr (VI) were respectively 0.40 and 0.31 µg·L⁻¹, the relative standard deviations (RSDs) were less than 10% and the recoveries were in the range of 88.0% to 99.0%. The release of Cr (III) and Cr (VI) in smoke was determined by this method in selected commercial cigarettes. Cr (III) and Cr (VI) in mainstream cigarette smoke were at levels of 0 to 15.4 ng/cig and 0 to 9.51 ng/cig, respectively. Compared the total of Cr (III) and Cr (VI) and total chromium in mainstream cigarette smoke, the proportion of Cr (III) and Cr (VI) in total chromium were in the range of 80% to 97%, and the release of Cr (III) were significantly higher than Cr (VI). The method was simple, fast and qualified to study the levels of chromium species in mainstream cigarette smoke.

Biography

Hui-Min Liu has completed his Master's from Zhengzhou University, and always engaged with the tobacco science in Zhengzhou Tobacco Research Institute. He is the Director of the Key Laboratory of Tobacco Chemistry of CNTC. He has published more than 60 papers in reputed journals and has done a lot of research on pesticide residue detection.

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