Determination of Tobacco Specific Nitrosamines in Mainstream Smoke of 2R4F Reference Cigarette by LC/MS/MS

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Tobacco specific nitrosamines(TSNAs) are known as the very important constituents of tobacco and cigarette smoke. More reliable and accurate analytical method is needed to quantify TSNAs although GC-TEA has been widely used. Four TSNAs(NNN, NNK, NAT, NAB) were determined from mainstream smoke of 2R4F reference cigarette. TSNAs were isolated by 100 mM ammonium acetate extraction, separated by liquid chromatography(LC), and quantified by electrospray ionization tandem mass spectrometry using isotopically labeled analogues internal standards. MS/MS acquisition was done in selective reaction monitoring (SRM) mode to provide high specificity and selectivity for TSNAs. Low flow metal needle enhanced the ionization efficiency for TSNAs. Metal needle showed higher sensitivity than conventional ESI needle. Limit of detection for this method was ranged from 0.2 ng/mL(NAB) to 0.8 ng/mL(NNN, NNK, NAT) using an injection volume of 3 μL. TSNAs were identified by retention time and ion fragmentation patterns which corresponded to that of standards. Levels of TSNAs in 2R4F cigarette smoke by LC/MS/MS were no significant difference compared with those of GC-TEA. LC/MS/MS method was no needed to be clean-up procedure and would be used to rapid and sensitive analysis of TSNAs as an alternative to GC-TEA.