1. **No.**

   FP01810124

2. **Title**

   Development of sensitive analytical method for the determination of passive smoking biomarkers by in-tube SPME/LC-MS/MS and their biological exposure assessments

3. **Period**

   2017-2019

4. **Summary**

Tobacco smoking is regarded as a cause of various cancers and cardiovascular diseases. Particularly, passive smoking in non-smokers is a critical public health problem. In this study, we developed selective and sensitive methods for the determination of nicotine (Nic), metabolite cotinine (Cot), tobacco-specific nitrosamines (TSNAs) and polycyclic aromatic hydrocarbons (PAHs) derived from tobacco smoke to assess the actual status of passive smoking by in-tube solid-phase microextraction (SPME) in combination with LC-MS/MS or HPLC-FLD. Using these methods, the content of these compounds in tobacco leaves, smokes and human hair samples were measured to assess the biological exposure. We also analyzed the factors of passive smoking due to long-term exposure from the amount of accumulation in hair and the self-reported questionnaires on lifestyle habits. From these results, the developed methods were able to automate all operation from sample extraction and concentration, analysis, and data analysis, and they were possible to analyze several pg/mg levels even from a single hair. In addition, these compounds were contained in the cigarette leaves of combustion cigarettes and heat-not-burn cigarettes in a large amount, and contained more in sidestream smoke than in mainstream smoke. Their contents in mainstream smoke of the heat-not-burn cigarettes were lower than in the mainstream smoke of the combustion cigarettes. Nic, Cot, TSNAs and PAHs in hair are useful biomarkers for analyzing the actual status of passive smoking in non-smokers. In the future, we will clarify the causes and routes of exposure to passive smoking and examine measures to prevent passive smoking.