

# **Enhanced Detection and Quantitation of Drugs-of-abuse in Urine and Oral Fluid by Solid Phase Microextraction (SPME) Coupled with Mass Spectrometry**

## **Executive Summary**

This project aims to develop methods for rapid, accuracy and sensitive detection of six common drugs-of-abuse, ketamine, methamphetamine, cocaine, ecstasy (MDMA), cannabis (THC) and heroin, and their metabolites in urine and oral fluids. Two different methods, i.e., direct coupling of solid-phase microextraction with electrospray ionization mass spectrometry (SPME-ESI-MS) and solid-phase microextraction coupled with portable gas chromatography mass spectrometry (SPME-p-GC-MS), have been developed in this project. Compared with the wooden-tip electrospray ionization mass spectrometry (WT-ESI-MS) method developed in the previous project (BDF120020), the SPME-ESI-MS method developed in this project offered much improved limits-of-detection (LODs) of the targeted drugs, which were able to fulfil the cut-off levels of the international standards, except for the detection of THC in oral fluid, and the linearity, accuracy and precision for quantitation of the drugs in urine and oral fluid by the SPME-ESI-MS method were generally acceptable for analysis of real-life samples. The SPME-p-GC-MS method was developed for on-site detection of drugs, but only signals from ketamine and THC could be observed using the portable instrument used in the project. Ketamine could be detected at high concentration (1 µg/mL) and the LOD of THC was 20 ng/mL, which may be applicable in some cases. Further improvement is still needed before the SPME-p-GC-MS method can be applied for analysis of various real-life samples.