

GendSAG: AN INNOVATIVE DNA COLLECTION TOOL ON CRIME SCENE FOR DIRECT AND FAST ANALYSIS

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Innovative collection tools, that allows rapid human DNA identification of victims and perpetrators from complexes crime scenes like the Paris terrorist attack at the Bataclan Theater in November 2015 or mass disasters like the GermanWings plane crash in the French Alps in March 2015 are essential when time is a crucial parameter for judicial and forensic investigations. The French Gendarmerie Forensic research Institute (IRCGNTM) innovation developed the GendSAG (Gendarmerie Sample And Go) device, which enables to sample the evidence and to go directly to the DNA analysis. The GendSAG (GS) device is a MicroFLOQTM (MF) (Copan Italia), in which micro-fibers have the capability to collect DNA from biological samples for direct DNA amplification by PCR and profiling with standard CE instruments. The objective of this study was to compare the performance of GS/MF rapid DNA process to traditional DNA analysis workflow. Traces prepared with diluted 0.5 ul of blood and fingerprints were collected in duplicate, one using GS/MF and another using 4N6FLOQSwabsTM (4N6FS) (Copan Italia) currently in use for the collection of biological traces. The GS/MF tip was inserted and broken inside a well of a PCR microplate prefilled with GlobalFiler PCR mastermix. DNA was amplified 28 cycles on thermocycler and profiled by CE at the injection parameters 1.2kV / 20s. Standard DNA extraction using Automate Express instrument and PrepFiler DNA extraction kit was performed from traces collected by 4N6FS. DNA was amplified and profiled as the GS/MF. Full DNA profiles were obtained in 2 hours by the GS/MF direct DNA testing and in 5 hours by the standard DNA testing from 0.5 ul of pure blood. Full DNA profiles were also obtained by the GS/MF from 0.5ul of blood diluted 1:50 compare to partial DNA profiles obtained by standard method This results demonstrate the efficiency of GS/MF collection device for fast DNA testing from microtraces by saving time and eliminating loose of DNA that occur during standard DNA extraction step. The GendSAG/MicroFLOQTM device allows the possibility of rapid identification of blood and body parts at disasters sites in a mobile Forensic DNA laboratory, is easy to use, enables to collect with high precision microbiological stains and minimize its alteration, reduces cost of labor and equipments required to perform high throughput analysis.