COMPARISON OF COPAN 4N6FLOQSWABS™ TO SWABS CURRENTLY IN USE FOR CRIME SCENE EVIDENCE COLLECTION

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Introduction: The ability to properly collect and transport biological material from crime scenes is important for samples preservation for successful forensic DNA detection and profiling. Crime scene samples are typically collected with DNA-Free cotton swabs, which raise two concerns. One, the ability of the collection device to absorb and preserve biological materials, the other how well the human cells are preserved on the device until DNA examination Currently are available collection devices that either requires drying after collection or use of costly devices with a drying agent. Copan 4N6 FLOQSwabs™ collection devices, produced on a Human DNA free environment by profiled staff , are human DNA, DNAase and RNAase free certified. The 4N6 FLOQSwabs™ are maximizing sample collection and release and are treated with an antimicrobial agent that prevents degradation of the DNA collected for prolonged room temperature storage. These collection devices also have a breaking point right above the swab that facilitate the release of the swab inside the nucleic acid optimizer (NAO™) (Copan) a semi-permeable basket that allows efficiently release all the sample from the swab.

Objectives: The objectives of this study were: 1) to compare the 4N6FLOQSwabs™ to the swabs currently in use for traces collection on different materials or objects retrieved from crime scene for investigations. 2) To evaluate the performance of the 4N6FLOQSwabs™ used with dry or wet and with and without the NAO™ for touch DNA collection.
Methods: Crime scene evidences, selected from our record files, were used for this comparative study. Traces, (N=200) of same nature were selected from our record files. One hundred traces were collected using the 4N6FLOQSwabs™ and another hundred with the swabs currently in use. Saliva, blood, semen and sweat for touch DNA traces on different materials, like cotton, plastic, glass, ceramic, were matched in order to have a proper evaluation. Sample collection ability of dry versus wetted 4N6FLOQSwabs™ was also evaluated with and without the use of the nucleic acid optimizer (NAO™) basket. The collection guides developed by Copan were used for collecting all the samples. After collection both swabs types were broken inside a NAO™ basket for nucleic acid extraction using the Biorobot EZ1 (Qiagen), the Maxwell 16 (Promega) or the Chelex 100 (Bio-Rad). Nucleic acid was quantified with the QuantifilerDuo Real time PCR, and amplified with the NGM SElect Express on Veriti 96 Well Thermal Cycler. Amplified fragments are then distinguished on the ABI 3500 xL.

Results and conclusions: The quantification data obtained demonstrated an increased recovery efficiency of biological material by the 4N6FLOQSwabs compared to the swabs currently in use, when used dry or wetted especially when tested with the NAO™ basket. All loci were detected in the blood traces profiles. Even if partial profiles were obtained from touch DNA traces, an increase in signal fluorescence was found when using dry swabs with the NAO baskets. From the collected data, was demonstrated that wet 4N6FLOQSwabs™ are better for the collection of body fluids while dry 4N6FLOQSwabs™ are better for touch DNA. The choice between wet or dry swab depends on the nature of the trace and on the matrix where the trace has been spotted.