EVALUATION OF DNA RECOVERY FROM COPAN GENETICS FLOQSwabs™ FOR HUMAN IDENTIFICATION

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Background: Collection and preservation of human cells is essential for successful forensic DNA testing. Buccal samples are typically collected with sterile traditional cotton swabs, which is a point of concern given that the sample must be preserved on the swab until DNA examination.

Copan developed the Genetics 4N6FLOQSwabs™ line specially dedicated to genetic application for the forensic field. Genetics 4N6FLOQSwabs™ are available in different formats, even with a double swabs in the same tube for original samples record and retention and have a 20mm breaking point to facilitate testing with the Nucleic Acid Optimizer (NAO), a semi-permeable basket that allows efficient release of all sample collected. Genetics 4N6FLOQSwabs™ are available with or without an integrated active drying agent in the cap of the plastic tube to avoid post collection air-drying. All 4N6FLOQSwabs™are produced "free" of amplifiable human DNA, of detectable DNAses and RNAses, and of PCR inhibitors.

Objective: the objectives of this study were to evaluate and compare: 1) Drying time of Genetics 4N6FLOQSwabs™ (W/O active drying system) to traditional cotton swabs. 2) Nucleic acids long term preservation of 4N6FLOQSwabs™ to traditional swabs. 3) Quantity of DNA recovered from buccal swabs collected with Genetics 4N6FLOQSwabs™ and traditional cotton swabs. 4) DNA recovered by Genetics 4N6FLOQSwabs™ with and without the use of the NAO.

Methods: In this study the drying time was performed by spotting same aliquots of buccal cell suspensions onto Genetics 4N6FLOQSwabs™ (with and W/O Active Drying System) and traditional cotton swab. Swabs were weighed at different timing to check for liquid loss. Equal aliquots of buccal cell suspensions were spotted on Genetics 4N6FLOQSwabs™, Omniswab (Whatman) and Bode DNA swabs in multiple replicates. The tips of the swabs were tested at different time and temperature points. Genetics 4N6FLOQSwabs™ were tested in duplicate with and without NAO. Buccal swabs were collected from volunteers, two using both Genetics 4N6FLOQSwabs™, one with active drying agent and one without, and another with traditional cotton swabs. Nucleic acids were extracted from all swabs types using the the PrepFiler® Forensic DNA Extraction Kit (Life Technologies) or with Nucleo Spin tissue kit (Macherey nagel). Extraction yield was determined with Quantifiler® Human DNA Quantification Kit and profiled on an ABI PRISM® 3100 Sequencer using Identifiler Plus kit (Life Technologies).

Results and Discussion: Data obtained from this study demonstrated that Genetics 4N6FLOQSwabs™ were able to air-dry more rapidly with respect to the traditional cotton swabs. 4N6FLOQSwabs™ inoculated with 30ul were completely dry after 40 minutes compared to 60 minutes for cotton swabs. Two hours were required for the 4N6FLOQSwabs™ to completely dry 100 ul compared to more than 3 hours for the cotton swabs. Buccal swabs collected with Genetics 4N6FLOQSwabs™ with active drying system and placed in the transport tube immediately after collection were completely dry after 24 hours from collection, this representing a great advantage, since the swabs need to be air-dried after the buccal collection, before being stored into their own tubes. Both the Genetics 4N6FLOQSwabs™ without the drying agent and the cotton swabs need to be air-dried after the buccal collection, prior storing into their own tubes. Better quantity and quality of DNA (≥ 30% with respect to BODE swabs, and ≥ 70% with respect to Omniswabs) was detected by the Genetics 4N6FLOQSwabs™. Good profiles and higher DNA (from 25 to 35% more) were obtained from swabs processed with the NAO than those without. Good profiles and higher DNA amount were obtained in buccal swabs collected with Genetics 4N6FLOQSwabs™ (average: 4500 ng/swab) with respect to traditional cotton swabs (average: 950 ng/swab). The Copan Genetics 4N6FLOQSwabs™ in combination with the NAO are a good tools for the collection of buccal swabs for Human DNA Identification.