COPAN 4N6FLOQSwabs® PERFORMANCE VALIDATION WITH VERIFILER™ EXPRESS PCR AMPLIFICATION KIT: A SIMPLIFIED FORENSIC WORKFLOW FOR HUMAN IDENTIFICATION

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Copan 4N6FLOQSwabs® (4N6FS) are highly efficient and safe collection devices of buccal cell samples for forensic human identification.

Current standard workflow involves DNA extraction and quantification of the sample eluted from the swab, before going through Short Tandem Repeat (STR)-typing. The obtained STR profiles can be used for the implementation of DNA Databases all over the world.

In the past few years, a lot of efforts were made to improve the quality of the forensic workflow and also to make it easier to use and more cost effective. In 2016 Thermo Fisher Scientific officially introduced the VeriFiler™ Express (VFE) PCR amplification Kit, a 6-dye, 25 STR multiplex kit that allows fast direct amplification of single source genomic DNA, without the need for sample purification.

The objective of this study was to evaluate the performance of 4N6FS using direct PCR and STR profiling with the new VFE kit, and compare it to the GlobalFiler™ Express (GFE) PCR Amplification Kit already available on the market.

In the initial optimization of the amplification conditions (Expt1) 7 different 4N6FS were used for self-collection from 7 different donors, as per Copan guides. The swabs were processed within 24 hours from the collection, according to Thermo Fisher instructions. The samples were amplified for 4 different cycle number (24-25-26-27), each in 10 µl and 25 µl reaction volumes, on Veriti ® Thermal Cycler. Subsequent DNA profiling data were analyzed in terms of average peak height (PH) and quality parameters, as suggested by the manufacturer.

The performance/concordance experiment (Expt2) was performed on 65 different 4N6FS by 65 different donors, collected and processed as mentioned above, with the PCR cycle number set in Expt1.The same Expt1 and Expt2 samples were then processed with the GFE assay.

Full balanced good quality profiles were obtained with 24 PCR cycles in VFE Expt1, for both the reaction volumes. In the VFE Expt2 some null or incomplete STR profiles (possibly due to the self-collection variability) were recovered increasing PCR cycles from 24 to 25.

VFE assay resulted in better quality STR profiles than the ones obtained with GFE kit in both experiments.

The data obtained demonstrated that Copan 4N6FLOQSwabs® perfectly perform with the new chemistry of the VFE kit, thus allowing the simplification of the standard forensic workflow for human identification of reference, paternity and DNA databank samples.