EFFECTIVE COLLECTION AND RECOVERY OF DNA WITH THE 4N6FLOQSwab™ SYSTEM

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DNA typing is the accepted standard for characterization of biological samples collected at crime scenes. Success of DNA typing is related to the amount of target material recovered from an evidentiary item. Amounts of DNA too small or that are too damaged or degraded may not allow analysts to obtain sufficient typing information useful in identifying the source of a sample. While most efforts are dedicated to improving the molecular biology of the genotyping process, a greater focus is needed on recovery of ample DNA for downstream analyses. The more DNA that is recovered, the better the chance is of obtaining a typing result that will be robust and reliable. One method of collecting stain materials is by swabbing. Devices are needed that can increase the yield of template molecules for DNA typing of challenged samples. Materials proficient at collecting biological samples often are not efficient at releasing DNA from them, while materials proficient at releasing DNA are not the best for recovering samples from crime scene surfaces. The primary collection device in current use (i.e., the cotton swab) is designed to recover biological stain evidence with reasonable efficacy; however, the release of DNA from the collection substrate represents only a fraction of the total DNA that is available. This shortcoming reduces the potential of acquiring sufficient sample and can compromise success of obtaining a genetic profile, especially for trace level samples. We have assessed the performance of the Copan 4N6FLOQSwab™ (Brescia, Italy) and compared the results with those obtained using cotton swabs. The difference between the two swab formats is that the 4N6FLOQSwab™ is coated with short nylon fibers that are arranged in perpendicular fashion by flocking. Thus, unlike cotton swabs, there is no internal absorbent core to disperse and entrap the specimen. The 4N6FLOQSwab™ collects the sample in such a way that it remains on the surface, which facilitates analyte release and elution. We have tested DNA recovery by swabbing of neat blood, diluted blood, semen, saliva, and trace touch samples. In all cases, DNA recovery of the 4N6FLOQSwab™ outperformed the cotton swab. Another value of the 4N6FLOQSwab™ system is the NAO basket insert which allows for one step processing of the swab tips. This approach reduces labor and chances of sample contamination. The results of our study support that the most critical step in forensic DNA analyses – collection and recovery of typeable DNA − can be augmented with an efficient workflow by using the 4N6FLOQSwab™ system.