

4N6FLOQSwabs™: A COMPARATIVE STUDY FOR MAXIMIZING THE RECOVERY OF DNA

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The 4N6FLOQSwabs™, developed by Copan Italia, are currently used to collect a wide variety of samples, ranging from touch DNA samples to reference buccal samples. These swabs have been utilized either dry, without the application of any kind of liquid medium, or wet, using water or varying concentrations of SDS. An experiment was designed in order to determine which liquid best facilitates the collection of DNA using the 4N6FLOQSwabs™. In this study, a cotton buccal swab was used to swab the inside of a donor's cheek up and down approximately 10 times. Cells were then resuspended in PBS in order to collect them in a liquid medium. The solution was then washed three times and resuspended in a final volume of 1 mL. A 20 μ L aliquot was then spotted onto a plastic surface a total of 42 times and allowed to dry overnight. The surface was swabbed using the 4N6FLOQSwabs™ in triplicate for each of the seven mediums used: dry, 0.01% SDS, 0.5% SDS, 1% SDS, 1.5% SDS, 2% SDS, and water, for each of the two different sets that were collected. Each wet swab used 25 μ L of medium. One set of samples was extracted 24 hours after collection, whereas the second set was extracted seven days after collection. The 4N6FLOQSwabs™ were placed into Nucleic Acid Optimizers™ (NAO™) in order to maximize recovery and were then extracted with the PrepFiler® Extraction Kit from Life Technologies™ using an elution volume of 50 μ L. The resulting samples were quantified using the Quantifiler® Human DNA Quantification Kit from Life Technologies™. The average DNA concentrations for the 24-hour samples were 0.0898 ng/ μ L, 0.1377 ng/ μ L, 0.1686 ng/ μ L, 0.0584 ng/ μ L, 0.0515 ng/ μ L, 0.0199 ng/ μ L, and 0.0423 ng/ μ L for the dry, 0.01% SDS, 0.5% SDS, 1% SDS, 1.5% SDS, 2% SDS, and water samples, respectively. The average DNA concentrations for the seven-day samples were 0.0047 ng/ μ L, 0.2599 ng/ μ L, 0.4152 ng/ μ L, 0.0396 ng/ μ L, 0.0096 ng/ μ L, 0.3422 ng/ μ L, and 0.0162 ng/ μ L for the dry, 0.01% SDS, 0.5% SDS, 1% SDS, 1.5% SDS, 2% SDS, and water samples, respectively. The quantification data was analyzed using JMP Statistical Software and a t-test was performed. The results of the t-test indicated that there was no statistical significance between the varying types of liquid mediums used with the 4N6FLOQSwabs™. Therefore, forensic laboratories have the option of choosing the most convenient method for DNA collection, based on ease of use and internal validations.

4N6FLOQSwabs™, PrepFiler® Extraction Kit, SDS