B9 Biological Stains Collected From Crime Scenes Using FTA® Paper

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After attending this presentation, attendees will learn about the utility of FTA® paper to recover and store semen and blood stains (from 1 to 10 microliters) from different surfaces (absorbent, non absorbent), as long as the quantitation and amplification protocols that yield better results with these stains.

This presentation will impact the forensic community and/or humanity by showing forensics scientists a new approach to recover biological evidences from crime scenes.

Proper collection and preservation of biological evidence recovered from the scene of crime is crucial to facilitate the analysis and interpretation of all analytical results, including DNA typing. FTA® paper is a wellknown and widely use medium to collect and store biological materials before completing DNA or RNA analysis. Its typical applications are basically focused on the generation of databases (clinical and forensic ones), although it has also been used for preservation of other biological materials, as those related to agriculture and forestry.

Among the main advantages of FTA® is its ability to preserve biological materials. When specimens are spotted or applied to the FTA® matrix cards, cell membranes and organelles are lysed, and the nucleic acids are released, causing both RNA and DNA to become entrapped in the fibers of the matrix. Therefore, biological samples such as blood or saliva can be preserved at room temperature (without further need to cool or freeze), and to rapidly inactivate organisms including blood borne pathogens, preventing the growth of bacteria and other microorganisms. Finally, it is also important to mention that archived samples are ready for analysis in less than 30 minutes, since the genomic DNA remains bound to the FTA® paper; this purification process is easily amenable for automation.

Blood and semen **s**tains ranging between 1 and 10 microliters were spotted and collected from 5 different surfaces (wood, cotton/clothes, tiles, glass, and carpet), after 3 different periods of time: one day, one week, and one month. Two different ways of recovery are being used. The first one is accomplished by moistening the FTA® paper with sterile distilled water and then pressing it against the stain. For the second alternative the stain is moistened with sterile distilled water and then the FTA® paper is applied.

Results show that FTA® paper is an ideal medium to collect dry specimens from hard, non-absorbent surfaces, such as wood, tile and glass. It is also good medium to collect cells from absorbent surfaces (carpet, cotton), although the performance depends on the size of the stain (amount in microliters of biological specimen spotted). The best approach is to first moisten the sample, and then apply and press with FTA® paper.

From non-absorbent surfaces, positive PCR amplification for autosomal STRs, Y-chromosome and correct allelic assignation have been obtained in all cases using as little as 1 microliter of blood or semen. It should be considered that the volume of 1 microliter used to test FTA®'s abilities is clearly smaller than most of the samples found at the scene of crime, where bigger biological stains will be more easily recovered with FTA®.

Among the advantages -already presented for bloodstains at the last AAFS meetingthe first one to mention is that this is an easy procedure to recover samples from the scene, since it is only necessary to add sterile distilled water into the sample and apply the FTA® paper; second, it is possible to store samples at room temperature for a long time; third, the preservation of the original support (the place where the biological fluid was deposited), since there is only a transfer of the cells from, i.e., the carpet or the wood, into the FTA®. Finally, a fourth advantage worth mentioning is the relative homogeneity in collecting and storing different kind of samples that could be achieved by using FTA® in a number of cases.

FTA®, Scene of Crime, DNA Analysis

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