

FINAL TEST REPORT

**Detection of Human DNA Contamination and DNase in  
14 Cotton, 14 Nylon Flocked and 14 Foam Swabs**

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Experiment Start Dates: September 22 and October 9, 2009

Experiment End Dates: September 25 and October 14, 2009

Study Numbers: DS09-01 and DS09-02

## Objectives

The objectives of the study were to detect the presence of human DNA contamination and DNase presence on the test swabs.

## Methods

### *Test Swabs*

PSR# 296-09, Lot 2297 (cotton, n = 14)

PSR# 290-09, Lot 2288 (nylon flocked, n = 14)

PSR# 207-09, Lot 2198 (foam, n = 14)

### *Detection of Human DNA Contamination*

Human DNA extraction on the test swabs was performed with an extraction buffer. An aliquot of the extract was added to the PCR buffer containing primers specific for human DNA. A positive control was prepared by adding 25 or 50 *pg* of human DNA to the PCR buffer. The negative control contained PCR buffer only. The reaction mixture was amplified for 50 cycles. The PCR products were subjected to gel electrophoresis. Gels were examined visually under ultraviolet illumination and photographed using a Gel Logic 100 Imaging system and Kodak MI SE software (v4.5.0).

### *DNase Detection*

A PCR reaction buffer containing 1 KB DNA ladder was prepared. Swabs were aseptically removed from packaging and placed in the reaction buffer. A positive control was prepared by adding DNase to the buffer. The negative control consisted of reaction buffer only. Swabs and controls were incubated for two hours at  $37^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , centrifuged at 12,000 rpm for 5 minutes, and 5  $\mu\text{l}$  of tracking dye were added to 25  $\mu\text{L}$  of the reaction buffer. Samples were electrophoresed on agarose gel and photographed using a Gel Logic 100 Imaging system and Kodak MI SE software (v4.5.0). Degradation of DNA ladder by the presence of DNase was examined visually.

## Results

### *Detection of Human DNA Contamination*

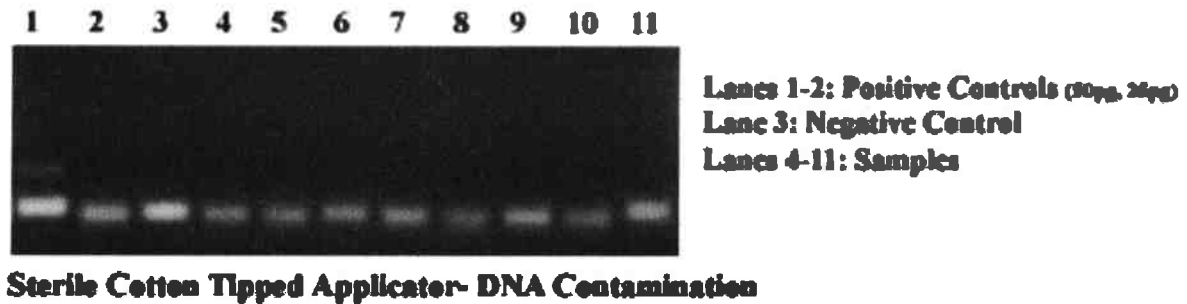
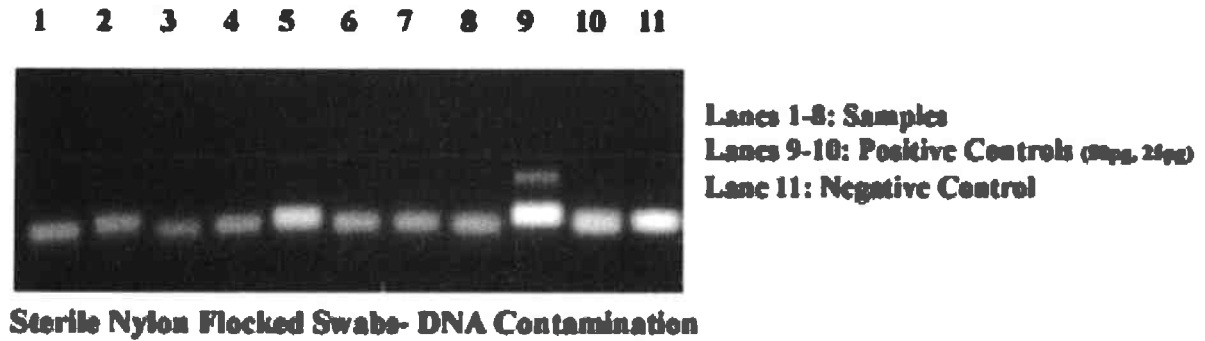


Figure 1. Gel electrophoresis pattern of amplified human DNA to detect human DNA contamination of nylon flocked swabs and cotton swabs after PCR amplification.

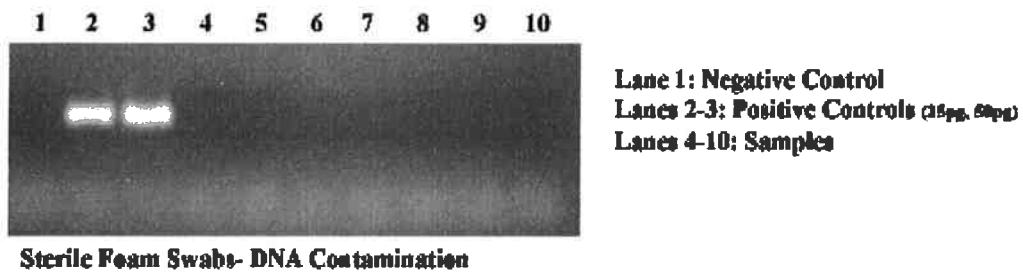
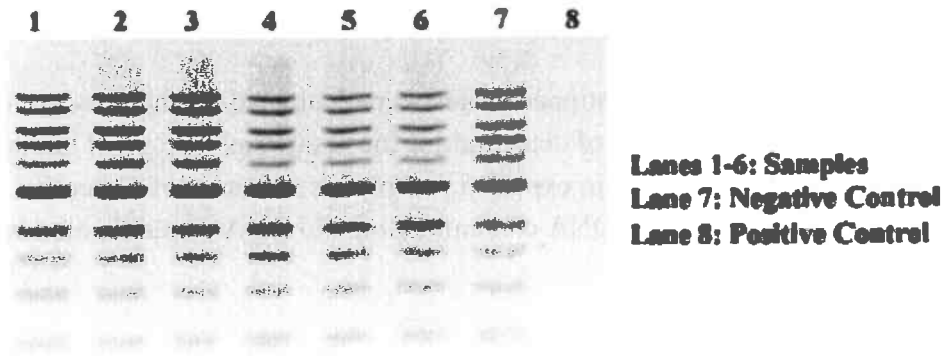
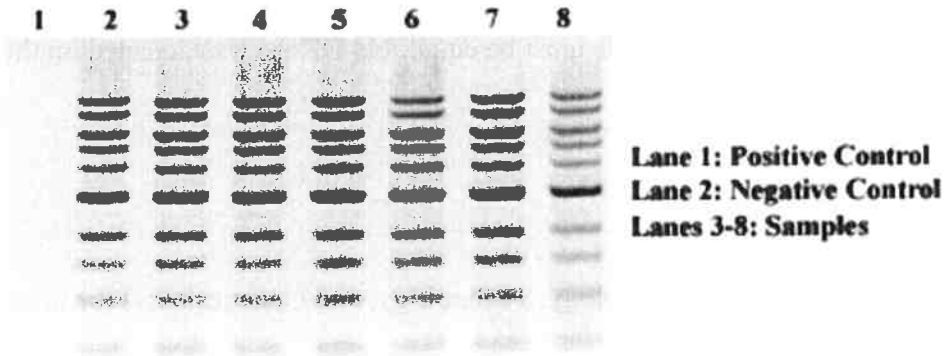


Figure 2. Gel electrophoresis pattern of amplified human DNA to detect human DNA contamination of foam swabs after PCR amplification.

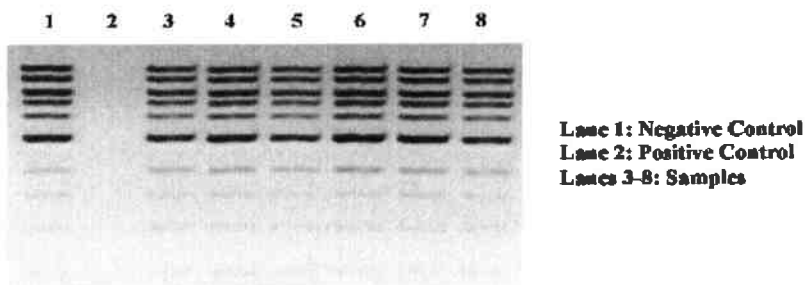
*DNase Detection*



**Sterile Nylon Flocked Swabs- DNase**



**Sterile Cotton Tipped Applicator- DNase**



**Sterile Foam Swabs- DNase**

Figure 3. Gel electrophoresis pattern of DNA ladder to detect the presence of DNase in nylon flocked swabs and cotton swabs.

## Conclusions

### *Human DNA Detection*

Fourteen cotton, 14 nylon flocked and 14 foam-tipped swabs were evaluated for the presence of human DNA contamination by PCR. The limit of detection for the assay was  $\leq 25$  pg of human DNA. Positive and negative controls were within expected parameters. Absence of a specific sized DNA amplicon indicated lack of human DNA contamination. No DNA contamination was detected on the swab samples tested.

### *DNase Detection*

Fourteen cotton, 14 nylon flocked and 14 foam-tipped swabs were evaluated for the presence of DNase by gel electrophoresis. Positive and negative controls were within expected parameters. The presence of DNase was determined by comparison to the negative control. The relative intensities of the negative control and test bands must be equal. No DNase was detected on the swab samples tested.

### Reference:

Butler, J.M. (2005) Forensic DNA Typing: Biology, Technology, and Genetics of STR Markers, 2<sup>nd</sup> Edn., Elsevier Academic Press, MA