DNA EVIDENCE IN PROPERTY CRIMES

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DNA evidence is nowadays used for the investigation of a wide range of crimes. Once reserved mostly for violent cases such as rape and murder, biological material recovery is not only restricted to such crime scenes anymore. As DNA technology is getting cheaper and faster, there has been a growing interest in using DNA to solve volume crimes, mostly property crimes. In this work, an analysis of more than 1300 samples of biological material recovered from more than 300 cases of property crime offenses processed by the Brazilian Federal Police Forensic Genetics laboratory is described. Most of the property crime offenses included: (1) ATM thefts, skimming or PIN capturing scams, (2) post office burglaries or armed robberies, (3) Federal government buildings burglaries.

Samples were recovered from more than a thousand evidence items sent to the lab, resulting in more than 1300 samples processed. An average of 3.5 items per case were sent to the lab, resulting in 4.4 samples processed per case. The most frequent biological material recovered from items was touch/contact DNA (38%), followed by material recovered from worn clothing (22%). Blood represented 19% of samples and oral/saliva samples 11.6%. Hairs (7%), fecal matter (0.22%) and others (~1%) were less frequently observed. DNA was obtained from samples by the organic extraction method or using Prepfiler Express DNA Extraction kits on the Automate Express (Life Technologies). Samples DNA was then quantified by real-time PCR using Quantifiler Human DNA quantification kit (Life Technologies). Blood (>97% of samples) and oral/saliva samples (85% of samples) presented the best results. After quantification, samples showing a DNA concentration higher than 0.005 to 0.01 ng/µL were amplified. Approximately 56% of samples met the threshold limit and were amplified using the STR kits PowerPlex 16 HS (Promega) or Identifiler Plus (Life Technologies). STR amplification showed that blood (86% of samples) and oral/saliva samples (29% of samples) were much more likely to yield single source full genetic profiles than samples of touched or handled items. Almost 50% of touch DNA genetic profiles were partial or presented low quality. Besides, 35% of touch DNA profiles resulted in mixtures. Only 15% of touch DNA profiles were single source full STR profiles. Hair and feces evidence showed the worst results, with only 3% of hair samples resulting in full STR profiles and no profiles obtained from fecal samples. In 53 cases, a suspect was identified and reference samples sent to the lab. In 23 of these cases, at least one match was observed between the suspect and the forensic samples. At least one genetic profile was entered into CODIS in 43% of the cases. So far, 6 forensic hits were observed. Samples that resulted in hits were 3 cigarette butts, 2 blood samples, 4 touch DNA samples, 2 drinking vessels and 1 glove.

Results obtained in this work showed what types of evidence are usually collected in property crimes and which ones provided the best results for DNA typing. These results can be used to better guide crime scene evidence collection practices in property offenses, making it more cost effective.

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