CODIS STR TEMPLATE ENRICHMENT BY AFFINITY BEAD CAPTURE AND ITS APPLICATION IN FORENSIC DNA ANALYSIS

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Short tandem repeat (STR) profiling is a workhorse in forensic analysis; however, investigations involving sub-optimal evidentiary DNA samples are often hampered by incomplete and/or ambiguous Combined DNA Index System (CODIS) STR profiles arising from a number of factors. Especially challenging are cases in which evidentiary DNA is degraded and/or co-extracted with polymerase chain reaction (PCR) inhibitors. In this study we investigate an affinity capture technology using streptavidin-coated beads and biotinylated CODIS STR primers to isolate and purify relevant STR templates for subsequent amplification and detection. This strategy is applied to obtain unambiguous CODIS STR profiles from challenging degraded DNA samples. The developed affinity capture process may also show promise as a cleanup technique for PCR inhibitor and bacterial contamination removal. In addition, we evaluated this procedure and demonstrated preservation of source DNA proportions in human DNA mixtures.