IN-HOUSE VALIDATION USING POWERPLEX® 16 STR MULTIPLEX ON THE ABI PRISM® 310 GENETIC ANALYZER

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The PowerPlex® 16 kit contains a combination of the 13 core CODIS STR loci and an additional two loci, Penta D and Penta E, in one reaction, which makes it useful in many forensic cases. With this kit, only one amplification reaction is necessary, compared to the two reactions presently in use for the core CODIS loci. A sample with low extraction volume and a low quantiation yield may still produce results for all the 13 core loci in one reaction. Presently, if a sample has an extraction volume of less than approximately 20 ul and a low quantitation yield, only one system, Profiler Plus®, may be attempted, resulting in only 9 loci. The use of the PowerPlex® 16 kit enables forensic laboratories to obtain more information from a single reaction from samples containing low yield, which is often the case in forensic samples.

The purpose of this study is to validate PowerPlex® 16 STR analysis on the ABI Prism® 310 Genetic Analyzer for forensic analysis. This includes operation of the software, the set-up of the 310, and the optimization of the reaction conditions. The experiments were conducted in the following area: the sensitivity of the kit, optimum injection time, concordance study, percent heterozygosity within and between loci, mixture study, reproducibility/precision study, minimum stutter height, inter-laboratory study, non-probative cases and sample study, and a literature review. The results of these experiments will be discussed.