DEVELOPMENT OF AN INNOVATIVE DNA QUANTIFICATION AND ASSESSMENT SYSTEM

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Recently introduced STR kits are highly sensitive, robust and discriminating thereby generating useful STR profiles from previously untypeable samples. Such samples often have low quantity and/or degraded DNA, may contain PCR inhibitors, and, in sexual assault samples, a high quantity of female DNA compared to male DNA. These factors can make it difficult to decide whether to continue with STR analysis, which STR kit to use and how much DNA to add to the STR amplification reaction for obtaining a useful profile on the first attempt. Thus, there is a need for a highly sensitive, robust, and faster method for the assessment of DNA extracts. We describe a new DNA quantification and assessment kit to provide better correlation between the DNA sample and resulting STR profile. This next generation DNA quantification and assessment kit has high sensitivity (sub-pg level), for both the human and male targets, higher inhibitor tolerance to match next generation STR kits and a unique metric for the determination of DNA quality; Degradation Index. The Degradation Index is a quantitative measure of the degree of DNA degradation, useful for the determination of how much DNA to add to the STR reaction and which STR kit to proceed with. The time required to perform amplification has been reduced, to less than one hour. Furthermore, the standard curve generation protocol is optimized to provide consistent results. We have successfully used this system as a decision making tool to obtain complete STR profiles from challenging samples. These samples include trace DNA samples, highly degraded DNA samples, low quantity of male DNA in a high level of female DNA as well as samples contaminated with PCR inhibitors. Data demonstrating how this new quantification and assessment kit provides valuable sample quantity and quality information for making critical decisions in the STR workflow will be presented, illustrating how this approach can facilitate enhanced efficiency and first pass success rates.