DEVELOPMENT OF A RAPID MULTI-LOCUS FLUORESCENT STR MULTIPLEX CHEMISTRY WITH IMPROVED SIGNAL-TO-NOISE AND INHIBITOR TOLERANCE CHARACTERISTICS

Schnibbe T., Scherer M., Müller D., Begemann S., Steeger B., Pakulla S., Breitbach M., Cornelius S., Bochmann L., Prochnow A., Engel H.
QIAGEN GmbH, Hilden, Germany

As forensic testing facilities have a responsibility to provide the results of genetic analysis within a very short time, speed is increasingly important in STR assays. However, this increase in speed should not be at the cost of robustness and sensitivity. The new generation of STR chemistry combines all the critical features necessary for rapid and reliable analysis of demanding forensic samples. Here, we present the results for a set of novel STR assays based on proprietary fast-cycling PCR technology.

This novel reaction mix allows the completion of a standard 30 cycle amplification in as little as 90 minutes. The basic protocol yields full and well-balanced profiles from 100 pg of template DNA. Even a single genomic DNA copy yields peak heights that are well detectable using the commonly applied analysis thresholds. The assay is very robust towards potential PCR inhibitors. It can tolerate concentrations of up to 200 ng/µl humic acid or up to 1000 µM hematin without showing allelic dropouts at any of the 16 amplified loci in the tested configuration. The multiplex chemistry furthermore provides a highly improved signal-to-noise ratio for easier interpretation of low copy number sample results. These features help to reduce the number of samples that have to undergo re-analysis, which further contributes to more streamlined and efficient laboratory workflows.