

QA/QC Tracking of High-throughput DNA Databasing

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The demand for DNA profiling at human identification laboratories has continued to grow over the past decade due to increases in volume and the wide variety of biological samples now amenable to the technology. Still, the success of both relationship and forensic applications of the technology is dependent on the production of robust results and conclusions that are defensible within the judicial system. To remain current with the testing demand, the need for high throughput production of profiles has led to the coupling of multiplex STR loci amplification with automation. Further streamlining of sample and data handling at all stages of the process have continued to maximize efficiency. A casework Laboratory Information Management Systems (LIMS) must therefore provide an interface for all pieces of the lab, from robotic DNA extraction, automated reaction creation, interface with electrophoresis systems, QC review recording, inclusive of on-line sample and batch history.

The Starfruit IdentiTrack LIMS is designed to track and manage the performance of each step in the DNA testing process, including: extraction from various sample types, the normalization of DNA through quantification methods, STR amplification and complete event log for each batch of samples. This feature is most important when troubleshooting problems. If test and QC samples are not linked together, reconstruction to delineate how a flawed result was produced is problematic. The batches, with all samples treated together at a single process step, including controls (positive, negative, extraction blanks, etc.), can be handled as a unified data set. Individual samples, or an entire batch (if the QC sample(s) fail), can be flagged by the user and returned automatically to the previous step. In this way, the LIMS helps maintain the list of samples available for the each process step, for each individual user.

This presentation will illustrate how to detect potentially flawed results and handle the relevant information by providing the benefit of database structure to cull, organize, and categorize the data sets. The ultimate goal is to ensure that the test results are generated within known limits of accuracy and precision. We will show how a modern LIMS can help.