

AUTOMATING STAIN DNA ANALYSES WORKFLOW NOT A RIDE DOWN EASY STREET



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PREPRODUCTION - 2014

Increasing number of biological stains led us to reorganize our whole forensic DNA laboratory workflow around the Hamilton/PrepFiler automated DNA extraction solution, so to abolish manual steps and save time. A lot of questions arose...

How to integrate barcodes in our LIMS to ensure a complete traceability ? Organize the sampling procedure and deal with urgent samples ? In addition we had to choose a sample plate format compatible with upstream instruments, a decapper and barcode readers.

PRODUCTION - 2015

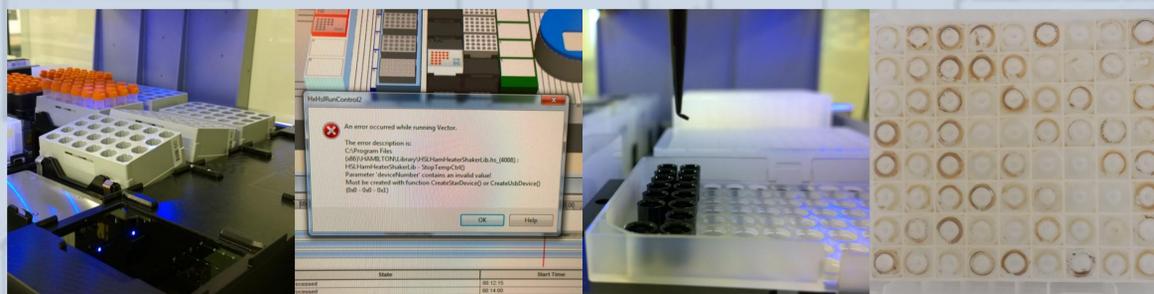
Everything was ready and we went into production. At that time we thought the project had come to an end.



Automated workflow. Micronic: barcode reader and plate. Hamilton: barcode reader, AutoLys STAR, STARlet and decapper. QIAgen: Corbett. TECAN: Freedom EVO 100

POSTPRODUCTION

This phase was underestimated. Based on a low risk of system crash we were not ready to finish extractions manually and ensure traceability. This required us to communicate with technical specialists and to troubleshoot possible issues we encountered.



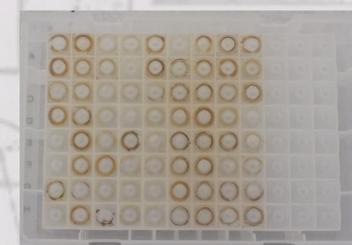
Various problems we faced during routine analyses: positioning, software, tips ejection, beads loss

TROUBLESHOOTING EXAMPLE

At the end of extraction, the purification step is controlled based on the evenly distribution of PrepFiler beads on the processing plate. However, about 5% of empty wells are observed. This issue may have different causes (Robotic, Chemical or Sample) and a negative impact on DNA yield. A long process of troubleshooting was then performed.

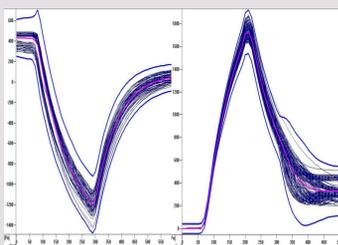


Evenly distribution



Poor distribution

Robotic



Hamilton TADM curves

Chemical



Two years old isopropanol

Sample



Blanks, two types of swabs

A robotic or isopropanol component was excluded. TADM curves showed no problem with beads aspiration or dispense. Beads were evenly distributed independently of the freshness of the isopropanol. The missing beads problem is assumed to be the consequence of an interaction between the chemistry of the PrepFiler kit and a particular swab type.

CONCLUSION

A project of this magnitude requires asking the right questions before its implementation and to deal rapidly with new ones when the method is in production. In our experience, a minimum period of about six months is required to master such a new automated environment and for the system to be completely adapted to the needs of the laboratory.