

VALIDATION OF THE MAXWELL® 16 FORENSIC INSTRUMENT FOR CASEWORK SAMPLES – A SMALLER AND MORE RAPID PLATFORM FOR URGENT SAMPLES

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For several years, our laboratory has been processing casework samples in 96 well plates on large liquid handling automated platforms (TECAN EVO) dedicated to DNA purification (DNA IQ™ chemistry), quantification and amplification. We found that an optimal workflow requires flexibility and we developed additional scripts that allowed processing fractions of plates. More recently, we decided to further increase the flexibility of our automated working chain by integrating a smaller and more rapid platform, the Maxwell® 16 Forensic Instrument. The Maxwell® 16 can process 16 samples at a time in approximately 30 minutes. Here we present the validation of the Maxwell® 16 low elution volume system for various types of forensic casework samples. We are now using the Maxwell® 16 mainly to process urgent samples.

We looked at DNA yield and profile quality obtained from a large variety of samples purified on the Maxwell® 16. Validation parameters included comparison between two different lysis protocols (Promega and in-house), prevalence of contamination and robustness. Satisfactory results were obtained with the Maxwell® 16 for all sample types tested, except for a few difficult ones: blood on a piece of rock, bodily fluids on absorbent substrates (diapers and feminine pads) and putrefied muscle tissue. Although sufficient amount of DNA was obtained with Promega lysis protocol for most samples, in-house lysis protocol provided higher yield for the majority of sample types tested. Therefore all samples in our laboratory are currently lysed using the same (in-house) protocol and can be purified interchangeably on either the TECAN or Maxwell platform.

When it comes to optimize the workflow, managing urgent cases is always a challenge but even more so in an automated working chain. We have dedicated the Maxwell® 16 primarily to urgent cases. The addition of this small scale, rapid platform to our existing large scale instrument fleet increases the flexibility of our working chain, and allows an efficient management of urgent samples without disrupting the normal workflow and delaying unnecessarily non-urgent cases. This proved to be particularly advantageous when our laboratory faced, in two occasions, mass disaster events.