POWERQUANT™ AND POWERPLEX® FUSION 6C: NEW "STREAMLINE" TOOLS FOR THE UP-TO-DATE FORENSIC LABORATORY WORKFLOW.

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The current forensic DNA lab faces everyday two main challenges: first, to give a real quality to test results by achieving and maintaining the accreditation standards; second, to look forward for a continuous improvement of the workflow, in terms of making easier and faster to achieve forensic DNA testing.

We are now working to a first evaluation of a novel quantification system (PowerQuant™) and a new 27 markers multiplex typing kit (PowerPlex® Fusion 6C). After the early phase of internal validation (not considered here), we suggest a possible first approach with these new chemistries, more strictly focused on the operating needs of the lab.

We have selected 30 challenging casework samples previously quantified with Plexor® HY and typed with both PowerPlex® ESI 17 Pro and PowerPle®x ESX 17. The Fusion 6C allowed us to estimate multiple parameters: the performance of this 27-plex with challenging samples and also a parallel comparison to ESI 17 Pro and ESX 17 (considered together); the latter couple of kits being till now the best system in use in our lab to "distillate" reliable evidence from challenging samples. Finally, the analysis of electropherograms obtained with ESI/ESX and with FUSION 6C, from an adequate number of challenging samples, gives precious pieces of information about the ability of PowerQuant™ degradation ratio parameter to produce useful predictions about the electropherogram's qualitative and quantitative features.

Our preliminary study indicates that PowerQuant™ and PowerPlex® Fusion 6C are both suitable for being easily and rapidly integrated in the ISO-17025 accredited lab workflow. PowerQuant™ gives reliable and precise information about input DNA quantity for downstream STR amplifications but also it seems to be able to predict, in a reliable manner, the qualitative and quantitative characteristics of the subsequent electropherograms we shall obtain.

Moreover, with PowerPlex® Fusion 6C we were able to produce full profiles also from challenging samples.

Finally, shortening the time required for quantification and amplification represents a concrete advantage for laboratories with high throughput needs.