

## **A COMPREHENSIVE APPROACH TO CASEWORK SAMPLE ANALYSIS: COMPARISON OF THE TODAY AVAILABLE KITS AND SOLUTIONS**

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It is notorious that a timely and precise answer to the increasing and highly demanding requests that a forensic genetic lab receives day by day is becoming a hard task even when working with the most up-to-date technologies and procedures. Analysis and correct interpretation of the profiles, especially where low template is involved, may slow the entire workflow, delaying and in some cases even preventing a timely investigation. Validation studies and setting tough and straight guidelines are vital to overcome the struggling backlog and speed up the analysis process. Companies in this field greatly helped, too, by offering innovative solutions and systems which are incomparably more sensitive, robust and reliable compared to the past. In order to validate the use of these new kits, we set a comparison trial with ten samples coming from the most widely diffused casework evidence. We extracted DNA from samples with magnetic beads technology in 50 µl. Then, we compared the quantification and amplification results obtained with the Promega systems and its most closely related competitor's kits. Quantification step: Promega Plexor® HY System, Quantifier® Duo DNA Quantification Kit and Investigator Quantiplex kit.

Amplification steps: PowerPlex® ESX System, AmpFiSTR® NGM™ PCR Amplification Kit and Investigator ESSplex Plus kit.

The quantification results are in accordance with the typing step of all the kits. The Plexor HY® kit is a little more sensitive and reliable than the two other kits even if the quantifications are overall comparable. We argue that the shorter amplicons may explain the slightly better results obtained with the Promega kit. The conclusive amplification step shows robust and quite often more sensitive results with Promega PowerPlex® ESX-17 kit, although it shows in some cases more PHR imbalance with respect the other kits. It's noteworthy that it's possible to combine the use of the PowerPlex® ESX and ESI kits to get more trustful results especially when using degraded or low amount of DNA.

All the kits tested are much better than the corresponding ones available in the past, and provides concordant high quality answers. ☘