INTEGRATING POWERQUANT™ INTO A FORENSIC LAB THAT UTILIZES Y-SCREENING

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The PowerQuant™ System from Promega Corporation is one of the latest versions of qPCR chemistry designed to quantify samples generated during genetic identity processing. In addition to quantifying samples, some laboratories use a technique, often referred to as "Y-screening", to determine whether questioned forensic samples have the presence of male DNA before DNA typing is attempted. By taking advantage of current assays to detect DNA, Y-screening can successfully identify samples that would result in probative male profiles even when serological techniques such as microscopic sperm search produce negative results.

A full validation of this chemistry was performed evaluating studies and criteria consistent with SWGDAM guidelines and FBI QAS. In addition to these specific guidelines, threshold assessments were conducted for both Y-screening quantification and quantification occurring after extraction to aid in processing decisions that would maximize the ability to obtain a comparable DNA profile and minimize the need to send samples forward for DNA typing. Key results to consider were related to sensitivity, variability when normalizing samples and whether undetected or zero values are accurately represented to be consistent with downstream results.

The results found during the full validation demonstrated that this new sensitive qPCR chemistry is an improvement over its predecessors in regards to sensitivity, reproducibility, person to person variability, and autosomal to male ratios. New thresholds for Y-screening and quantification performed after extraction need to be applied as well as consideration to added features such as degradation index.