EFFECT OF PIPETTE PERFORMANCE ON THE INTEGRITY OF DNA ANALYSIS RESULTS

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Modern DNA analysis methods commonly use sub-microliter liquid volumes. Manufacturer's specifications for pipettes operated at these low volumes are quite broad, and there is additional variability introduced by faulty operator technique, the use of different tip designs, and by undetected pipette failure. Although results of DNA analyses are generally not highly dependent on volume, the use of serial dilutions at these small volumes can cause errors to propagate and grow. To make things worse, it is difficult to calibrate pipettes at these low volumes using traditional gravimetric method; so two pipettes set at 0.5 ul may be delivering substantially different volumes.

This paper will discuss a photometric method, the Artel PCS, for calibrating small liquid volumes that provides superior accuracy and precision at low volumes. It will also present results from field testing that show the impact of operator technique and undetected pipette failures on laboratory results.

Finally, data will be presented showing the effect of tip design on the performance of small volume pipettes.