

A Simple Spectrophotometric Method to Measure Flocked Swab Absorption as an Alternative to Complex Research Methods

Previous studies have focused on research methods such as scanning electron microscopy (SEM), radioactive tracer (RT), and zeta potential (ZP) measurements as well as water and protein absorbance of whole flocked swabs to determine their absorption characteristics. Based on the CLSI M40A document Roll Plate method, experiments were conducted to validate the performance of spectrophotometric (OD) measurements after removal of HydraFlock swabs Puritan Medical Products and nylon flocked swabs Copan Diagnostics Inc., immersed in 100uL of standardised bacterial inocula in a microtitre plate for 30 sec. 12 flocked swabs of each type were assessed using three serially diluted suspensions. Subsequently 25uL of a red dye was added to each well to visually compare the differences in volumes. Finally, the absorption of 100 uL of viscous lactophenol cotton blue dye by both flocked swab types was compared visually.

Results: *Optical Density measurements*

Concentration	avg OD range	Concentration	avg OD range
Pur 105 -0.0039	-0.001 to -0.005	Cop 105+0.026	+0.012 to +0.045
104 -0.0019	-0.000 to -0.005	104+0.025	+0.014 to +0.036
103 -0.0036	-0.000 to -0.007	103+0.024	+0.009 to +0.032

(Blank avg OD -0.0006)

Red dye assessment: Copan swabs appeared to have more leftover inoculum. *LPCB dye absorbance test:* The Puritan swab buds were ~90% blue while Copan's swabs were ~60 % blue.

Conclusions: The OD measurements for HydraFlock® and Copan flocked swabs relative to the blank suggests there is left over inoculum after absorption with the Copan flocked swab but not the Puritan swab. The OD method is in line with the 100uL volume the CLSI M40A document recommends, while the other absorption method saturates the entire swab with 1.0 mL of water or serum and requires sophisticated instruments and training to perform as does SEM, RT and ZP methods.. The OD method is rapid, less tedious and requires less training and expensive equipment than the SEM, ZP or the RT methods. However results of the OD method are in agreement with those of SEM and ZP methods. The OD method, the red dye visual assessment and the LPCB dye uptake experiments show that the HydraFlock® has a greater propensity to absorb fluids than Copan's nylon flocked swab.