

## Daily Non-Invasive Fluorescence Ratio Measurement of Platelet Concentrate pH can Detect the Presence of Bacteria

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**Background:** Bacterial contamination can change the pH of stored platelet concentrates (PC). Measurement of pH is currently done for quality control of PC on a limited basis. Measuring pH has required invasive sampling techniques which risk contamination and are labor intensive. A non-invasive device was evaluated that enables daily pH measurements and continuous quality assurance. **Methods:** Scaled versions of platelet storage bags were prepared with an optically clear sampling port containing a disc of pH-sensitive fluorescent dye. A fiber-optic based device was used to illuminate the dye and a ratio of fluorescence emission at 2 wavelengths was measured. The ratio is correlated to a pH value. PC collected by apheresis were divided into several bags across three categories: normal, underfilled and bags to be inoculated. Bags were spiked with bacteria at the time of division of the PC. Measurements were taken following 4 hours of equilibration and at least daily thereafter. Non-invasive measurements were compared to pH measurements using a blood gas analyzer. **Results:** Measurement of pH with the fluorescence ratio method gave approximately +/- 0.1 pH unit accuracy when compared to blood gas analyzer measurements. A variety of bacterial strains were detected within 28-72 hours following spiking into the bag. Some strains caused transient fluctuations in pH that were detected by daily monitoring, but would not have been detected by single end-point measurements. **Conclusions:** Daily measurements utilizing the non-invasive fluorescence ratio technique facilitated the detection of bacterial contamination and delineated trends associated with rapid deterioration of product.