

pHantastic Embryos And Where To Find Them: Can A Real-Time pH Monitoring System Represent The pH Environment Of Culture Media?

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Background

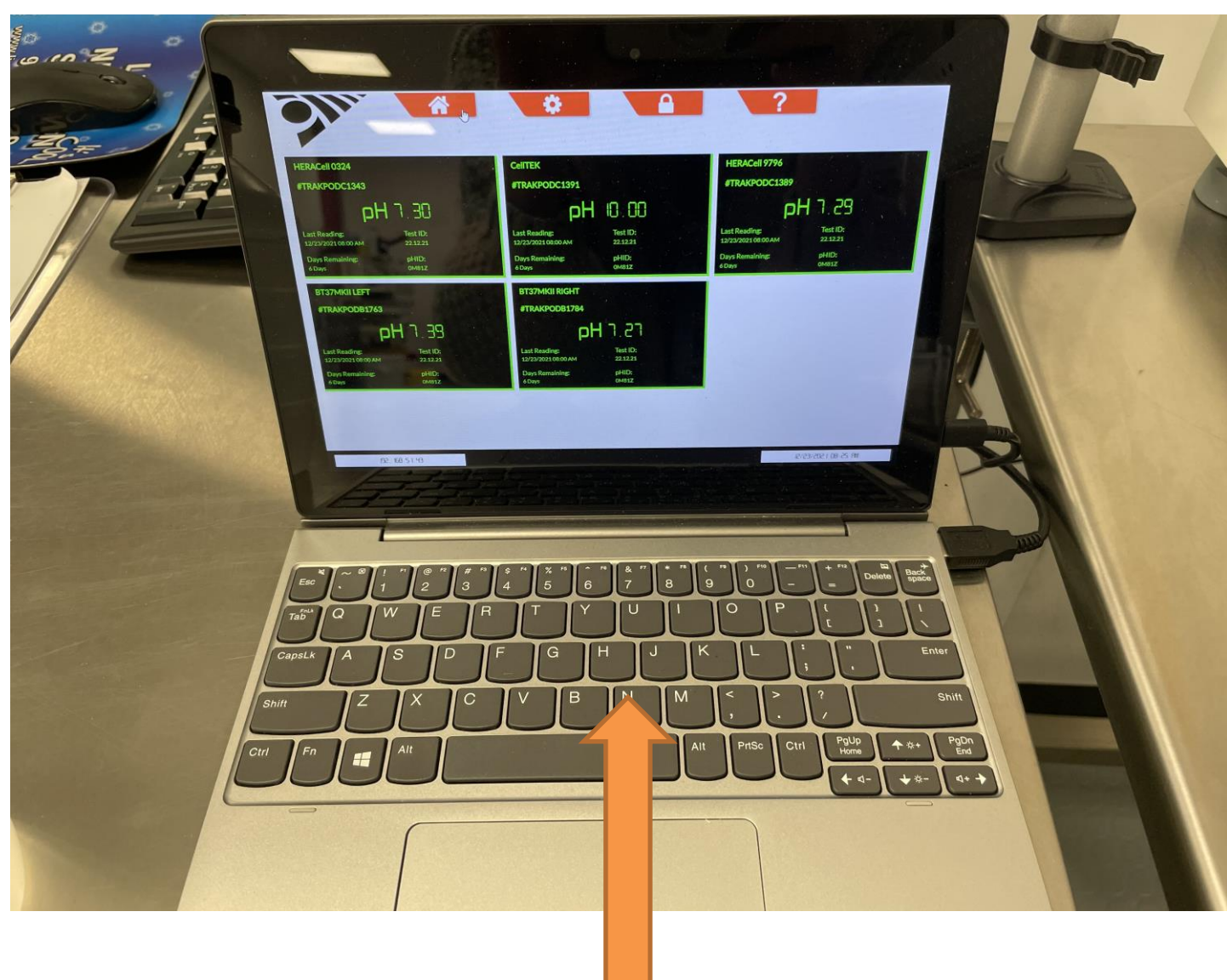
Maintaining optimal pH of culture media reduces environmental stressors on gametes and embryos, which is critical in supporting embryo development. SignipHy™ is a system that monitors pH in real-time within the incubator environment without disturbing the incubator or exposing the media to atmospheric conditions.

Objective

To determine if the SignipHy System can provide an accurate representation of the dynamic pH in culture media across a range of environmental conditions

Methods

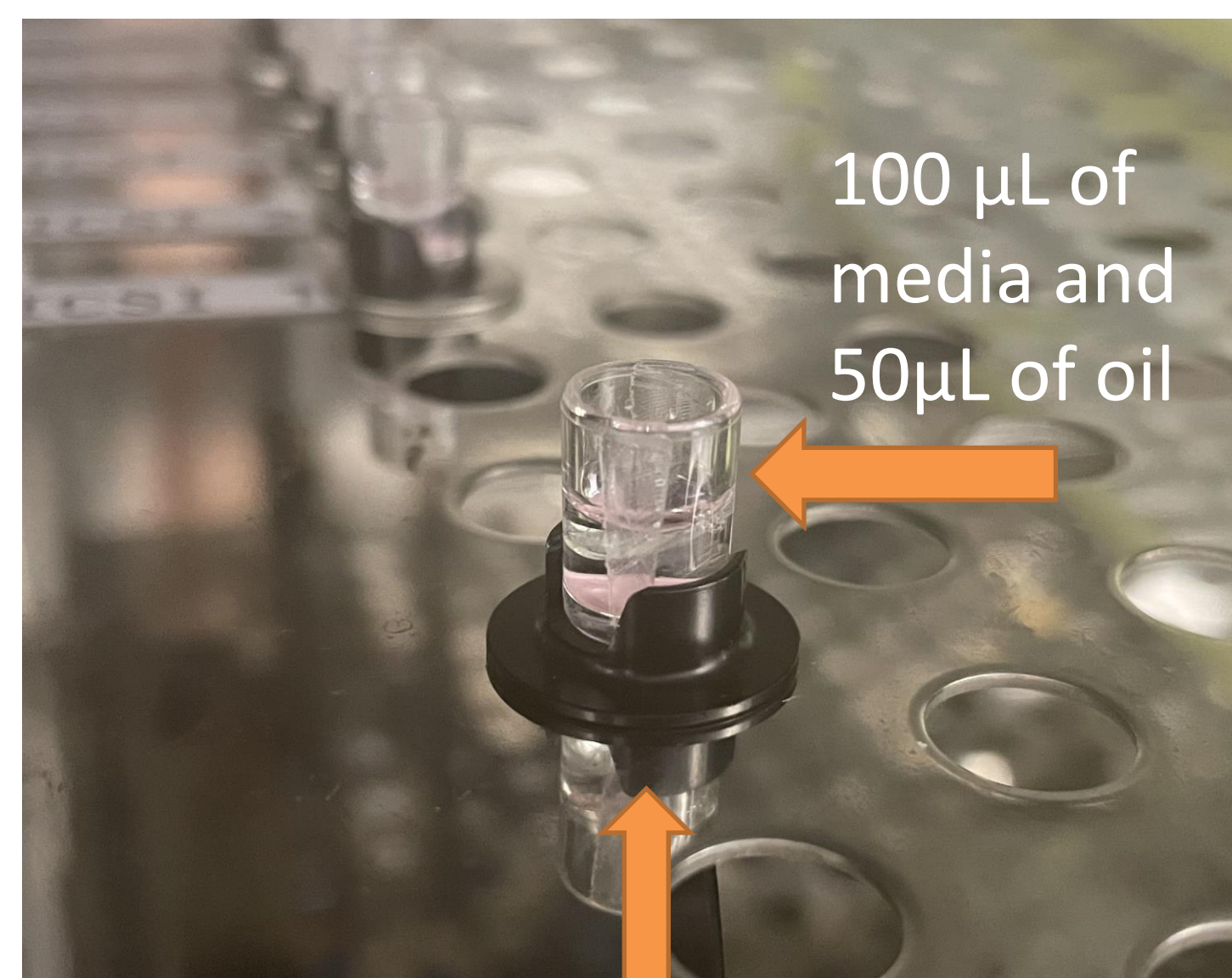
pH of Vitrolife G1+ under Vitrolife Ovoil in a 5-well dish was measured using a blood gas analyser and SignipHy at regular intervals under multiple experimental conditions. Statistical analyses used repeated measures ANOVA, Pearson's Correlation and Linear regression.



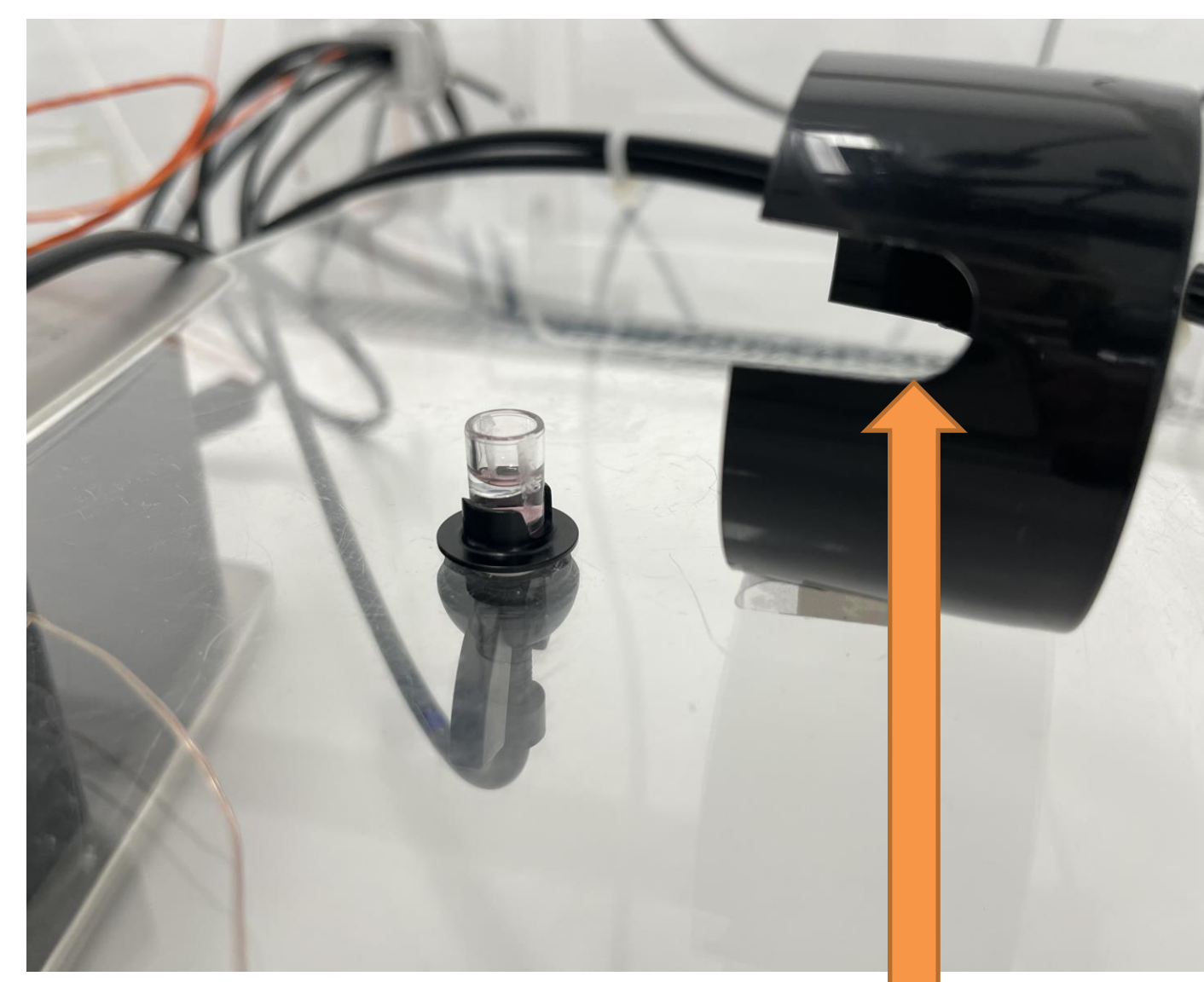
Tablet with TrakStation software



sv² sensor cup on TrakPod in BT37MKII Planer



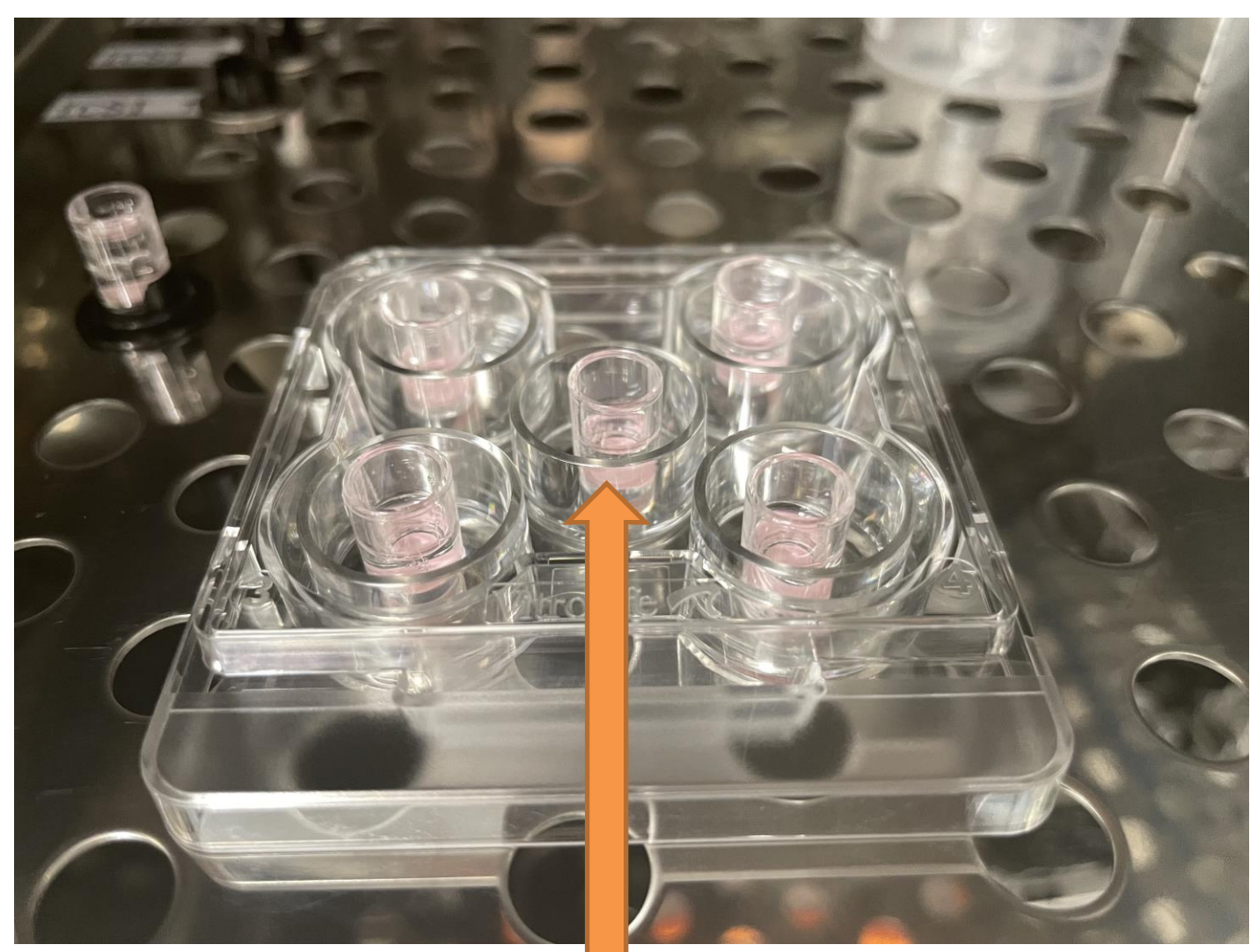
TrakPod (fluorescent measurement device with a fiber optic cable)



sv² sensor cups are photo sensitive and must be kept in the dark



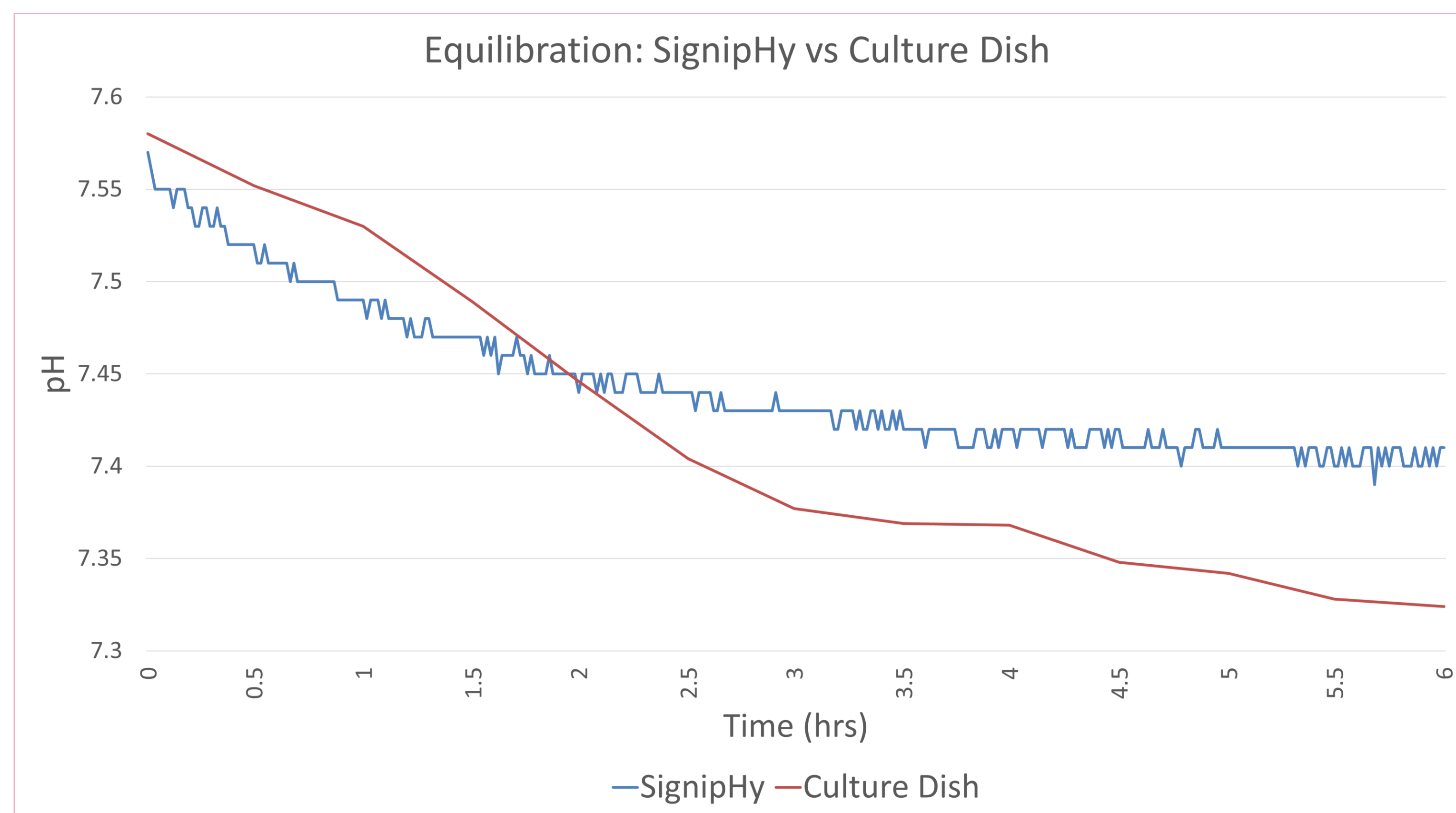
SignipHy qc² Alignment Tool – for QC testing



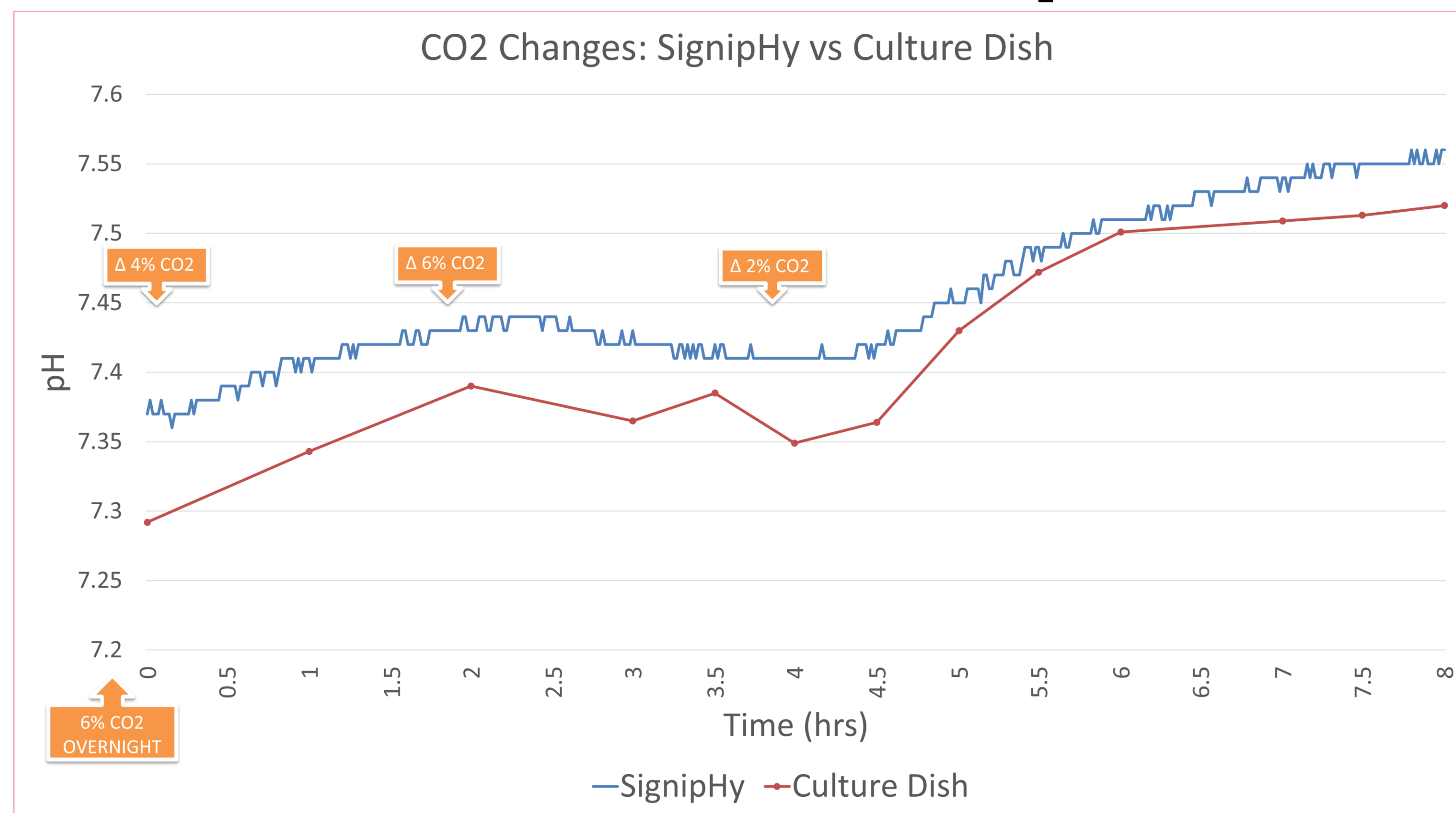
Sensor cups and media equilibrated for 10-24 hours before routine operation

Results

pH of media undergoing initial equilibration was found to decrease more rapidly in culture dishes (Δ pH 0.228/hr) than SignipHy (Δ pH 0.160/hr) over a 6 hour period ($p=0.0005$). Full equilibration was achieved in the culture dishes after 4 hours, while the SignipHy sensor stabilised after 6 hours.



When fully equilibrated dishes were exposed to 4% CO₂, both systems tracked the resultant increase in pH. pH in the culture dishes increased more rapidly (Δ pH 0.098/hr) than SignipHy sensor (Δ pH 0.060/hr). Similarly, equilibrated media exposed to 2% CO₂ showed an increase of pH in culture dishes of 0.171/hr compared with SignipHy sensor at 0.150/hr. SignipHy has a slight delay but still closely follows the pH changes in culture dishes under changing CO₂ concentrations.



Conclusion

SignipHy was found to be a viable representation of dynamic pH under multiple experimental conditions, however, the rate of change was found to be slightly slower compared to standard dish preparation.