Wearable Microfluidic Colorimetric Sweat Sensors for Real-Time, Personalized Hydration Monitoring

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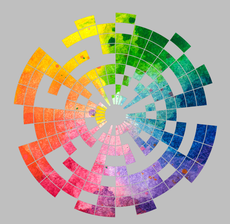


Introduction

- **Sweat rate and composition are different from person to person**
- **Sweat contains biomarkers (Na^+, lactate, etc.) indicative of internal physiology when normalized with continuous sweat rate**

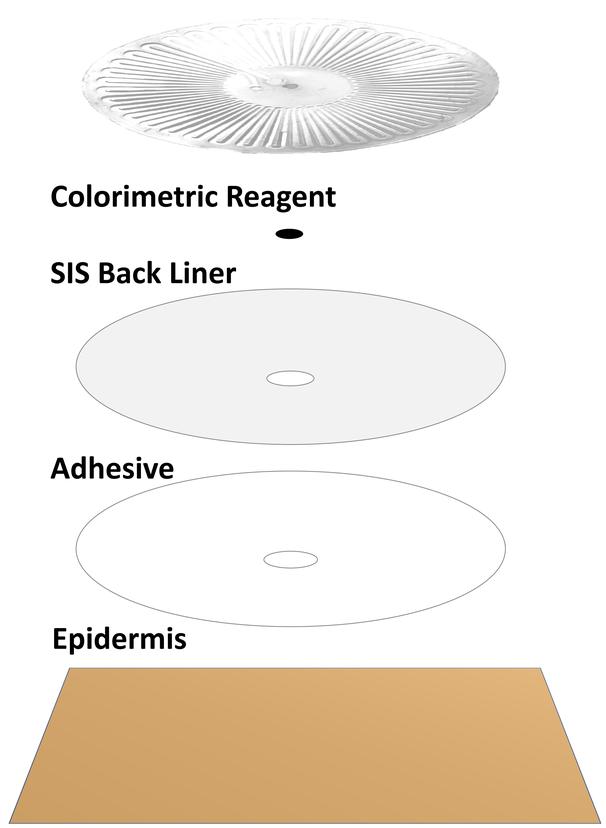
Approach

- **Collect and store sweat noninvasively on the skin using silicone elastomers**
- **Use of a dye that dissolves dependent on flow rate**
- **Visually analyzation of color development to identify rate**

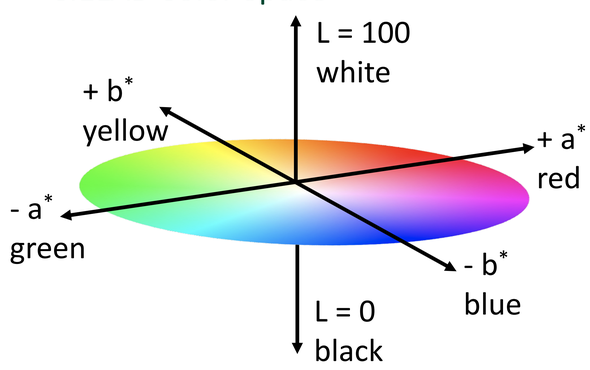
Methods

- **Test dissolution rate at known flow rates**
- **Measure dissolution rate using image processed CIELAB values**
- **Correlate CIELAB values to flow rate**

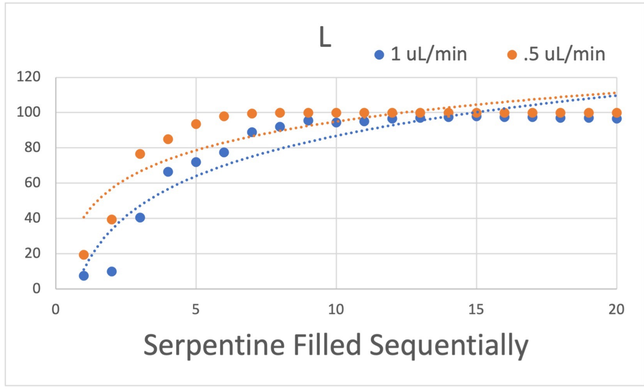
Sweat Sensor Schematic

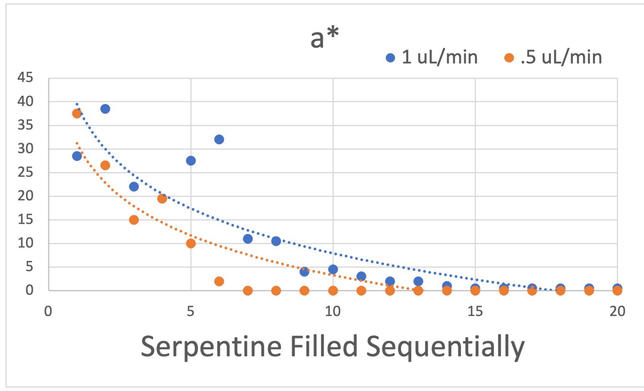


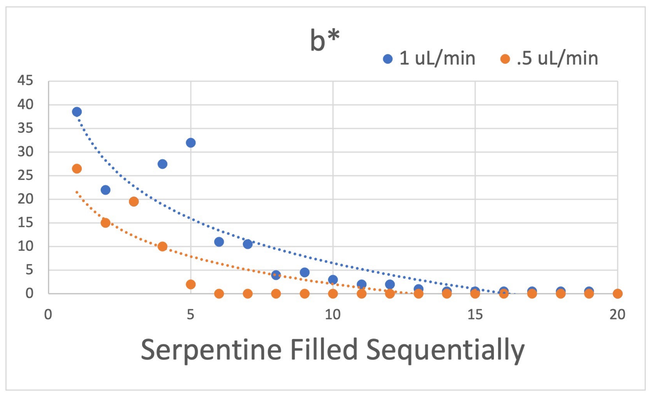
CIELAB Color Space

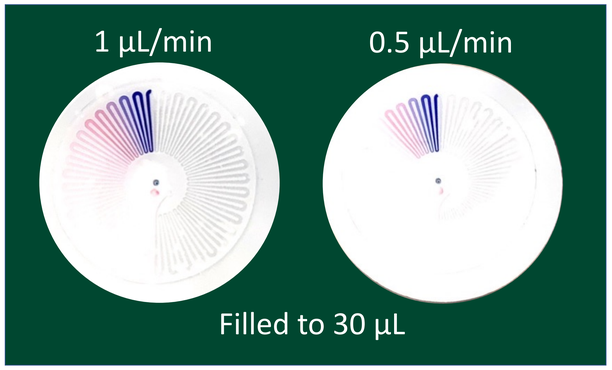


Flow Rate on Average CIELAB Values









Results

- **Found a significant difference in the 5th to 10th filled serpentine in all CIELAB values**

Future Directions

- **Increase sample size**
- **Decrease variance**
- **Standardize image recording protocol**
- **Record in RAW opposed to JPEG**

Acknowledgements

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