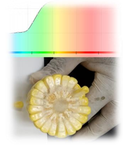
ALTERNATIVE NON-DESTRUCTIVE COLOR-SCANNING FOR SWEETNESS IN SWEETCORN



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Introduction

- Prepackaged fresh or frozen sweetcorn-on-the-cob and shelved corn are popular groceries for many shoppers. Instore quality is commonly determined by packaging date rather than the actual sweetness and this presents storekeepers with the challenge of arbitrary grading and consumers with less-informed purchase decisions.
- Methods such as infrared meters are vulnerable to atmospheric interference when used remotely and are less effective on contact at freezing temperatures.
- In this study, we tested prospects of using the less vulnerable and easy to access radiation in the visible range to detect the sweetness of corn-on-the-cob.
- The purpose of our study is to improve the ease of in-store quality monitoring and to enhance consumer experience.

Figure 1 Branded frozen sweetcorn-on-the-cob and shelved corn in a local grocery store in the U.S. Virgin Islands. Brand names have been blurred.

Method

- We used general-purpose, deep-scanning color spectrophotometer to scan three sections of multiple fresh sweetcorn-on-the-cob from three cultivars.
- Color signals in the visible range (400-700 nm) based on the International Commission on Illumination(CIE)'s LAB color space models, were correlated with the actual Brix obtained using a digital refractometry. The process we employed is described below:

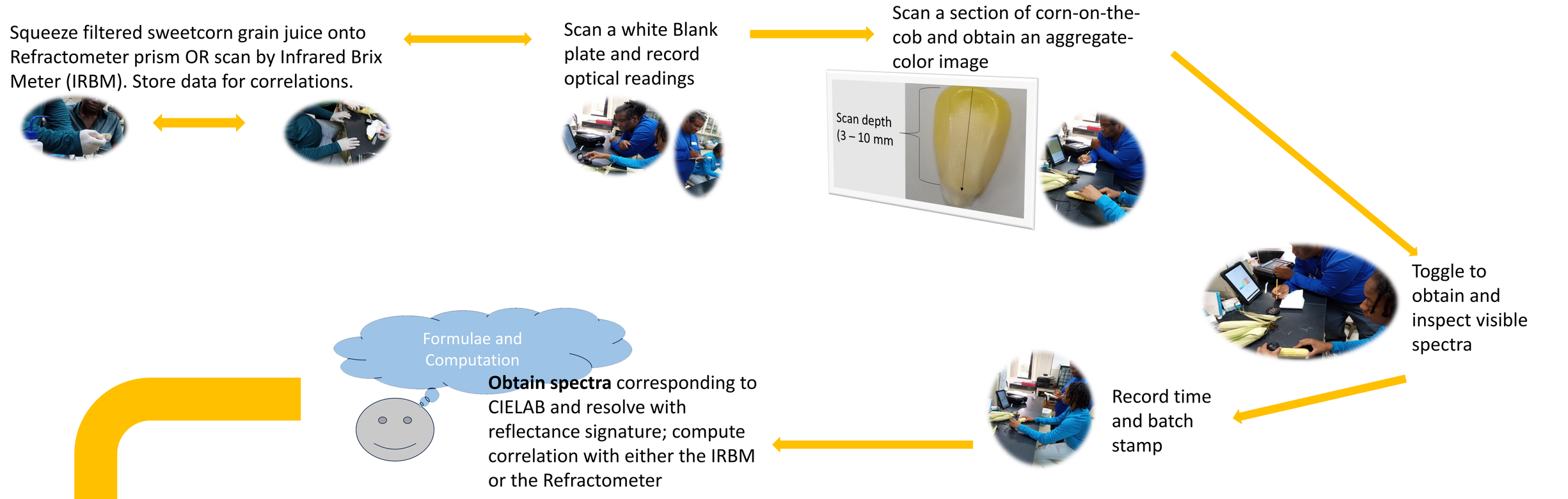

Figure 2 The procedure we used to obtain signature light spectra for sweetness in fresh sweetcorn

Key finding

A thin band (424 – 429 nm) in the blue spectrum can measure sweetcorn sweetness by ~ 76% accuracy.

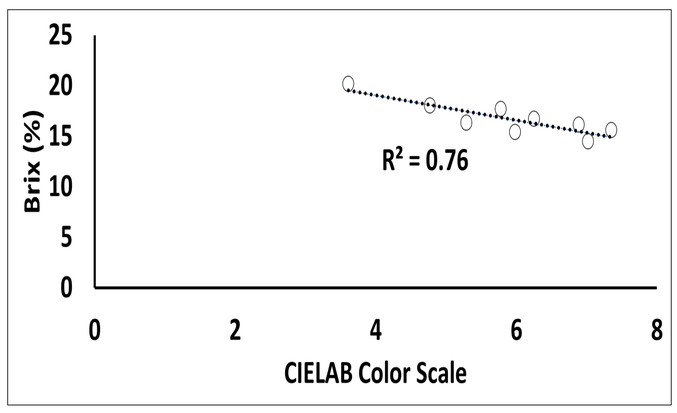

Figure 3 Correlation between sample readings from refractometer and the study test Color Scanner. CIELAB, International Commission on Illumination LAB color space

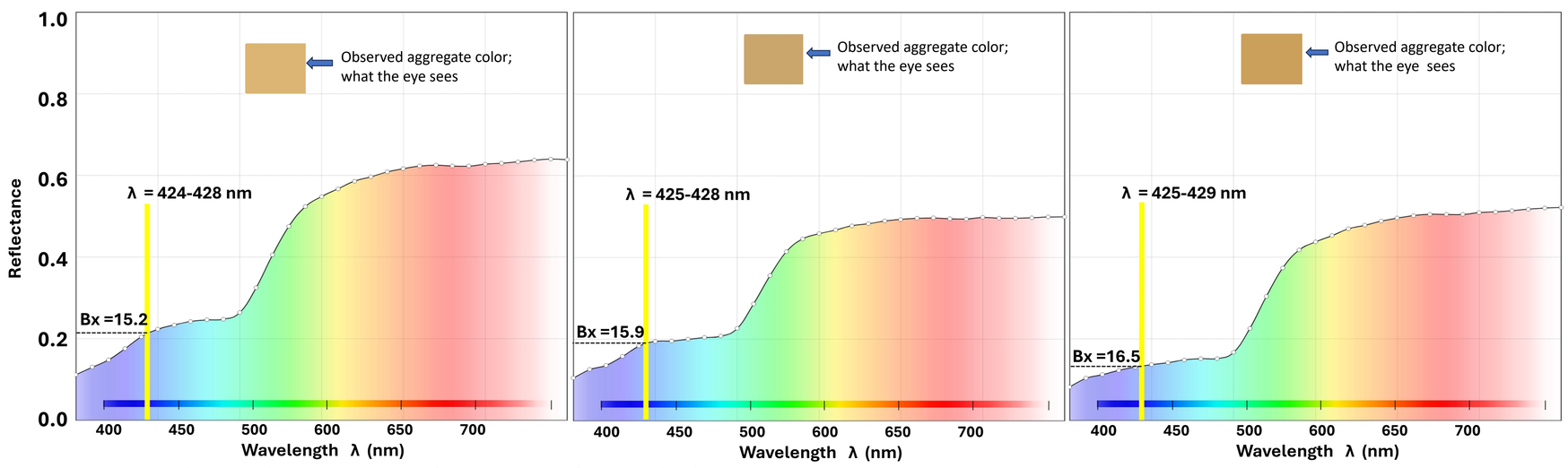

Figure 4 Color quality corresponding to specific Brix (Bx)

What we are doing to improve accuracy

Further model tests under different storage conditions to define single, reliable wavelength for potential remote use.

Conclusion

These preliminary findings suggest that the visible color space can be finetuned to accurately, and quickly determine corn sweetness without the need for laborious refractometry and the air-sensitive infrared.

Potential implication and use

When this refining process is completed, our results will significantly contribute to the improvement of high throughput sensor instrumentation used for postharvest and in-store quality monitoring of fresh and frozen sweetcorn, and potentially, of other produce.

Acknowledgements

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