



Determining if a Given Trait is Viable for a Commodity

There are two methods for determining trait detection within a commodity utilizing the F-750 Produce Quality Meter:

1. Building a Model
2. Scan two or three fruit/calibration samples

We have an SOP for evaluating the quality and results of option 1 through results analysis (R^2 , RMSECV). We cannot build a model for every trait and commodity of interest due to time constraints. Additionally, there is often a learning curve for sample presentation and we lack the facilities for many reference methods. This document provides the SOP for evaluating option 2, which enables a “yes” or “no” answer in 1-2 hours.

To determine a simple “yes” or “no” for detection of a compound/trait within a commodity, we can use a calibration range of a pure sample in a transfection arrangement. This is comparable to our sugar water studies. If the compound of interest is IR overtone active, we will see it as a change in spectra from a pure water sample.

Example:

Make four 30ml dilutions of pure Capsaicin (5%, 10%, 20%, or 30% by wt) in water. If a rainbow effect over a large spectral range is seen in the Model Builder software, then we can confirm the F-750 works for Capsaicin.

To determine whether the F-750 can see through the skin of a specific commodity for a trait we know we can detect:

Collect Data:

1. Take a scan of the skin
2. Peel the skin until the tissue of interest is exposed
3. Scan the tissue of interest
4. Repeat for a second location or fruit

Evaluate Spectra:

- A. If a reference value can be measured, you can compare the rainbow effect of scanning through skin vs. scanning with no skin.
- B. If no reference value is available, you can look at the relative difference skin/no skin spectra for each location. They should have equivalent changes in peak intensity.

Alternative Method/Checks:

1. Visual light penetration through two layers of skin can provide a quick-check to the answer determined above.
2. With a 20% sugar water mixture in a transfection arrangement, take a scan of the solution. Then take a scan of the solution with a single layer/piece of skin between the F-750 and the cuvette. Then take a scan of the solution with two layers/pieces of skin between the F-750 and the cuvette. You can then evaluate the decrease in sugar water signal due to the attenuation by the skin.

I hope this helps to explain the process of determining the viability of a trait within a commodity, and as always feel free to contact us with any questions about the F-750 Produce Quality Meter by e-mailing: support@felixinstruments.com or navigating to our website for supplemental training materials at www.felixinstruments.com/support.