Estimation of the physiological maturity of bell pepper

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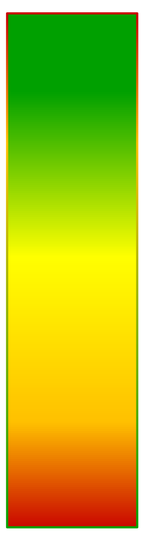
1. Introduction

The consumption and popularity of bell pepper (*Capsicum annuum* L.) are growing, mainly due to its characteristic flavour and the wide variety of colours.



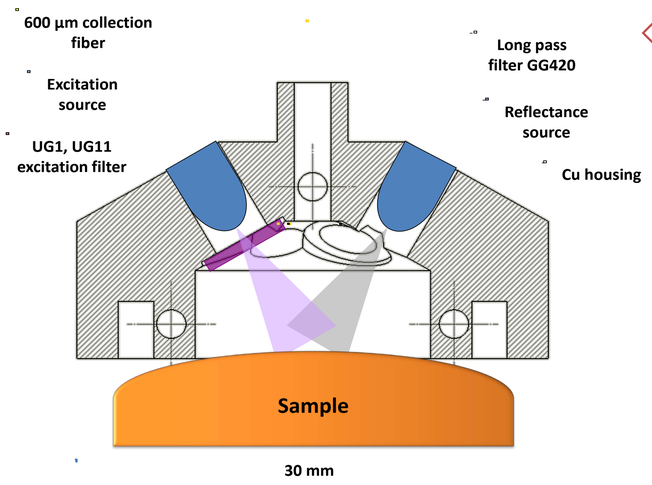
Chlorophylls a and b and their oxidation products give greenish colours

Carotinides gives yellow, orange and deep red colours

2. Objective

Can we use LED induced **fluorescence/reflectance** spectroscopy to estimate physiological maturity (age) of paprika?

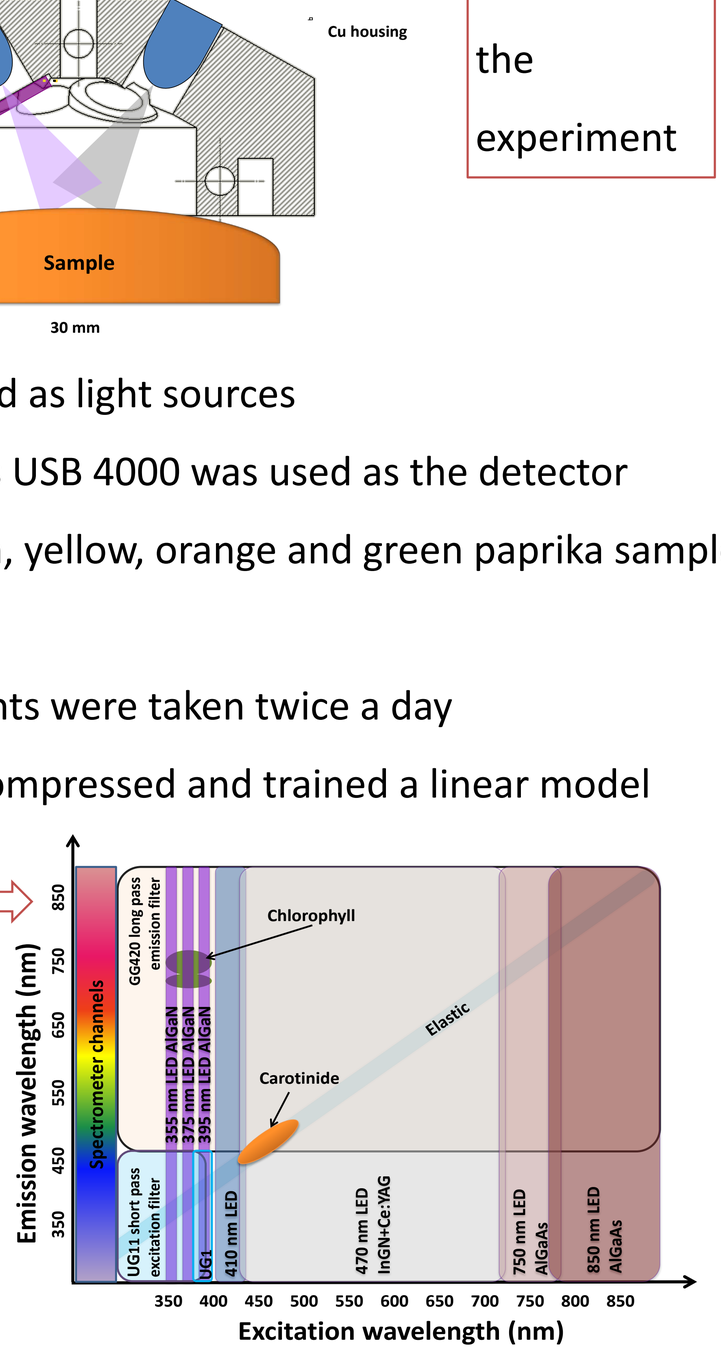
3. Methodology



The sensor head used in the experiment

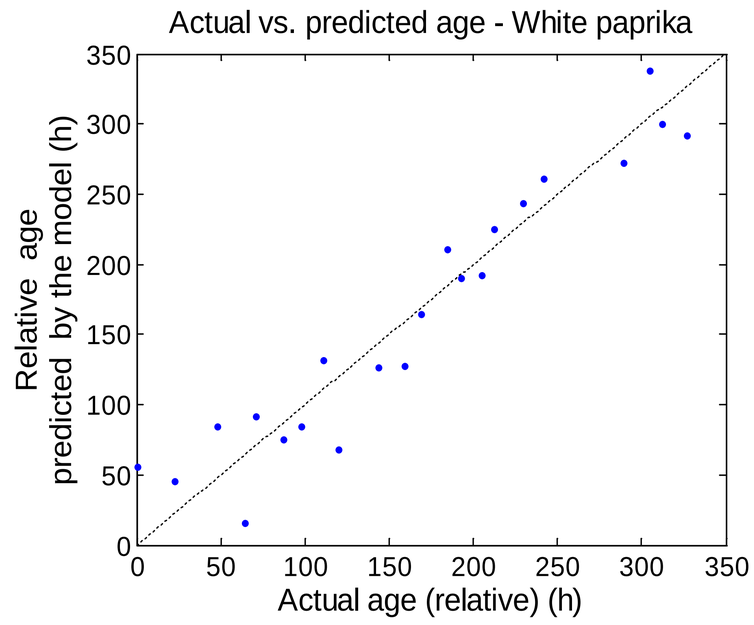
- LEDs are used as light sources
- Ocean optics USB 4000 was used as the detector
- White, green, yellow, orange and green paprika samples were used
- Measurements were taken twice a day
- Data were compressed and trained a linear model

Excitation-emission matrix



4. Results

For a given sport physiological aging can be estimated with ± 6 h accuracy (following is for white paprika)

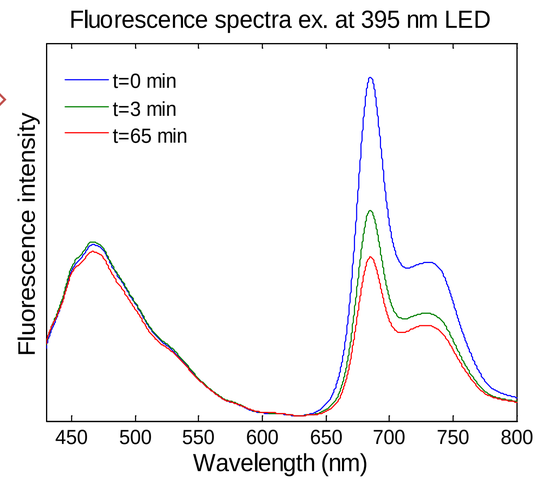


- The most suitable spectral components for different varieties for estimating the physiological maturity is as follows

Paprika Sample	Suitable combination of Spectra	Confidence level	Truncation	RMSE (h)	R^2
White	R, F375	96.9 %	3	27.7	0.96
Yellow	F375	98.2 %	3	23.3	0.96
Orange	R	98.4 %	3	36.0	0.91
Red	F355, F375	97.5 %	4	27.9	0.96
Green	R, F375	93.0 %	3	21.2	0. 97

Where, R- diffused reflectance, F *xxx* fluorescence excited by LED with *xxx* nm centre wavelength

There is no significant effect on the photo-bleaching for this experiment



5. Conclusions

- Physiological maturity of a certain part of a fruit can be estimated using LED based optical spectroscopic method
- Need to develop more robust imaging application for estimating maturity of a whole fruit

6. Acknowledgment

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