University of Peradeniya

Multispectral Imaging for Condition Monitoring

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1. Validation of multispectral imaging for the detection of selected adulterants in turmeric samples

- Turmeric powder is often adulterated using various additives and colorants.
- The existing methods of identifying adulterants in turmeric are laborious, expensive, and time-consuming.
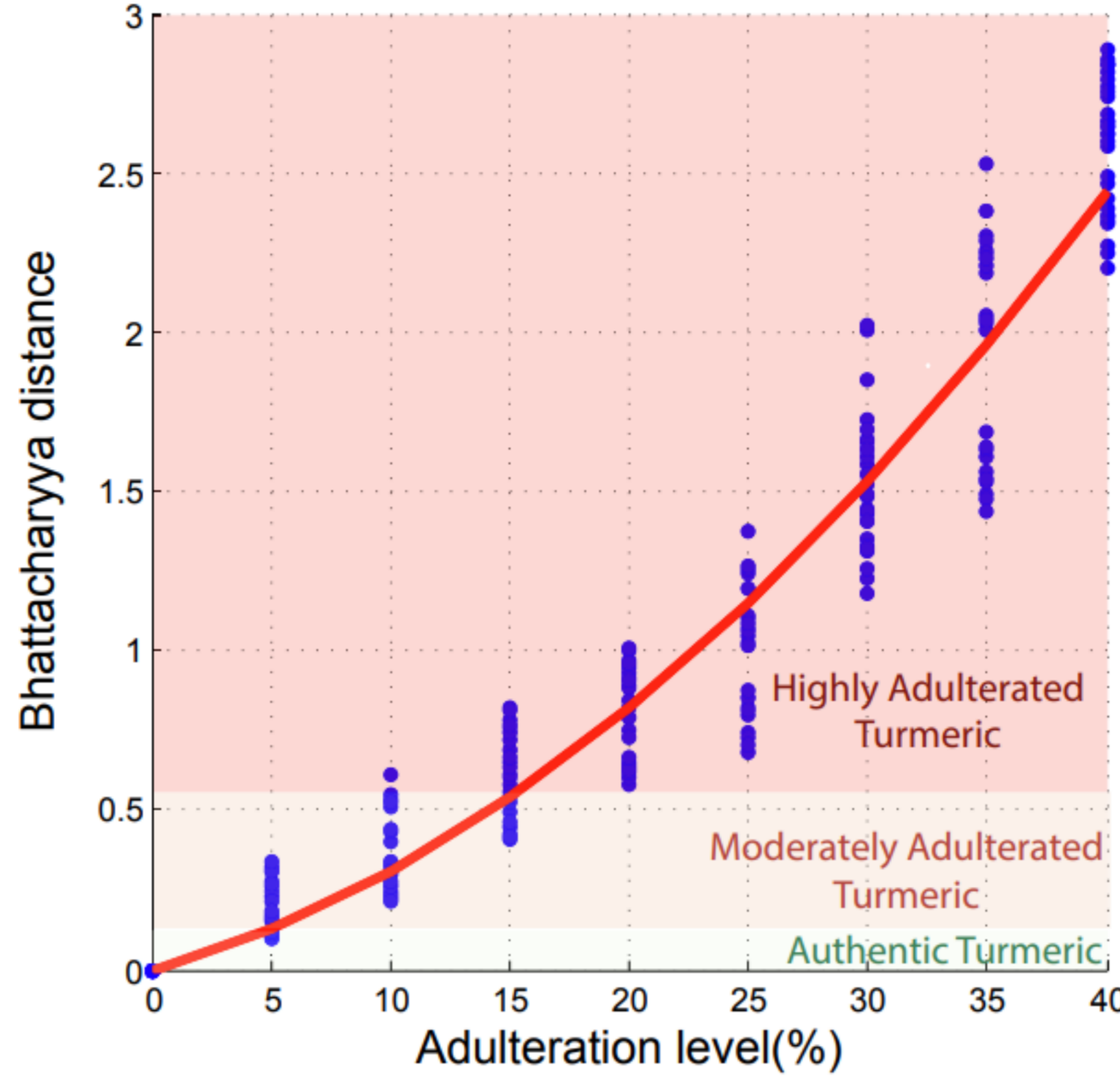

Developed functional relationships between the Bhattacharyya distance and JM distance with the adulteration level of colored wheat flour in turmeric powder
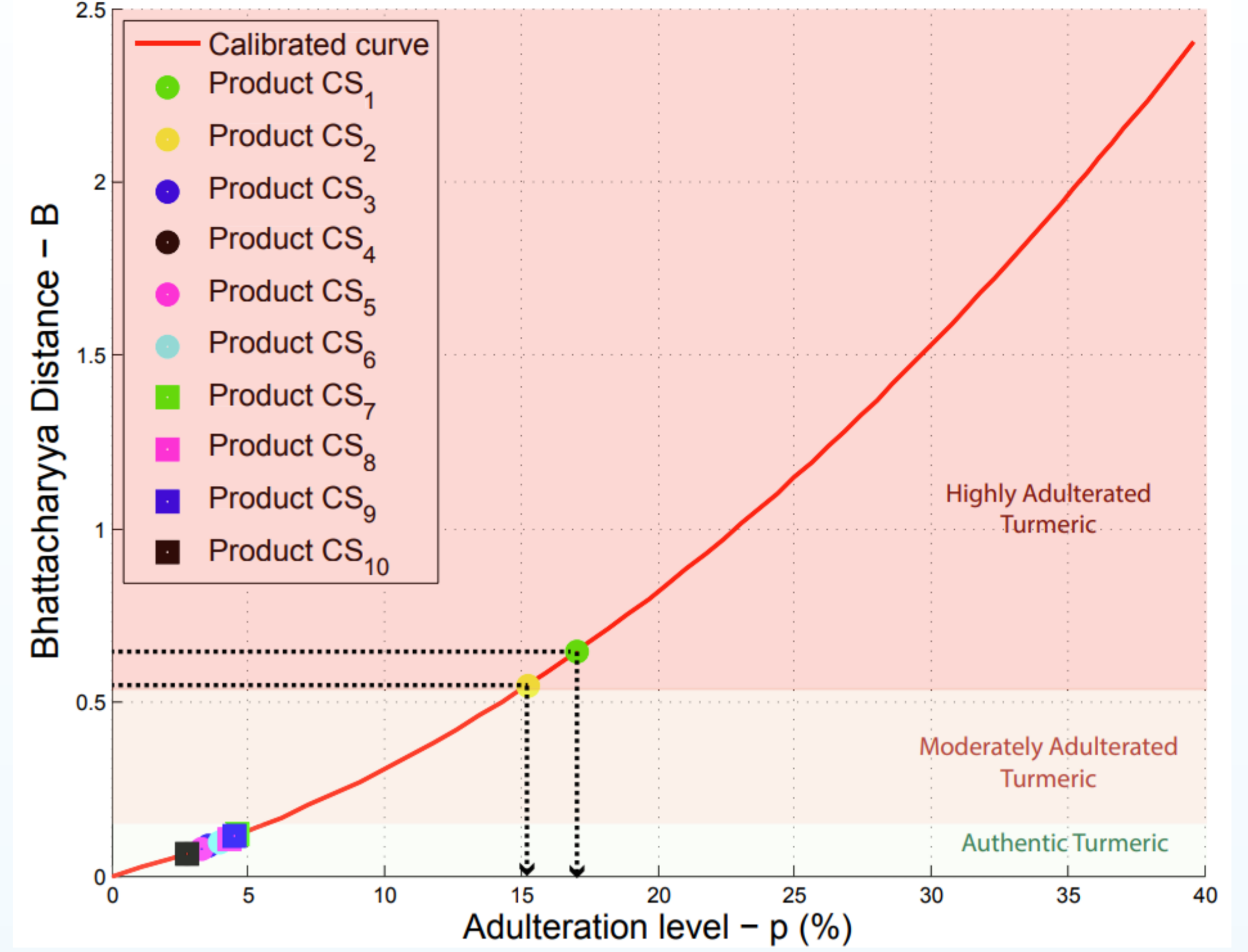
Adulteration level estimation of commercial samples from the developed functional relationship

2. Transmittance Multispectral Imaging for Reheated Coconut Oil Differentiation

- Oil reheating significantly impacts global health due to its extensive consumption.

Pure Oil | 1 time heated | 2 times heated | 3 times heated | 4 times heated | 5 times heated
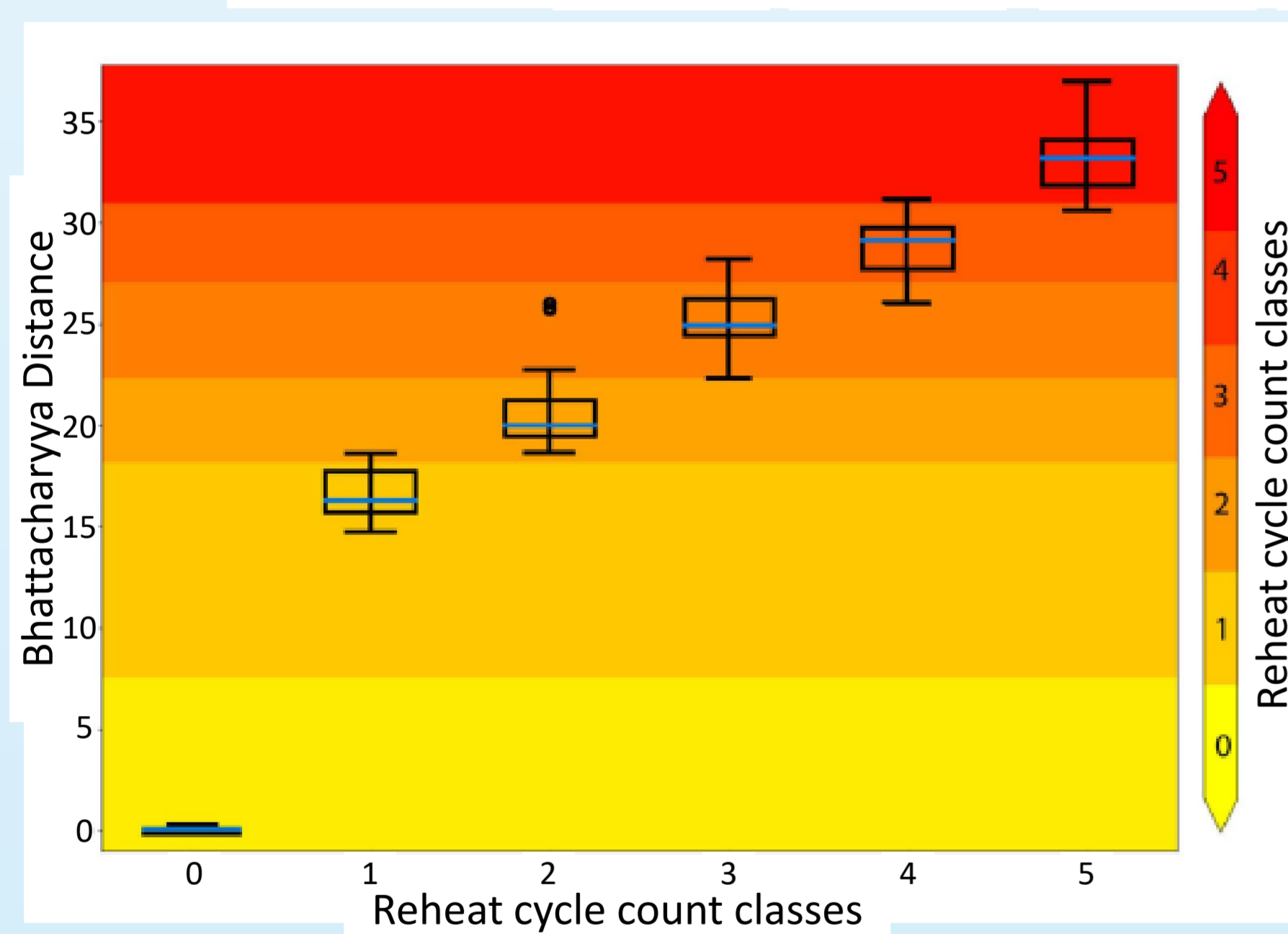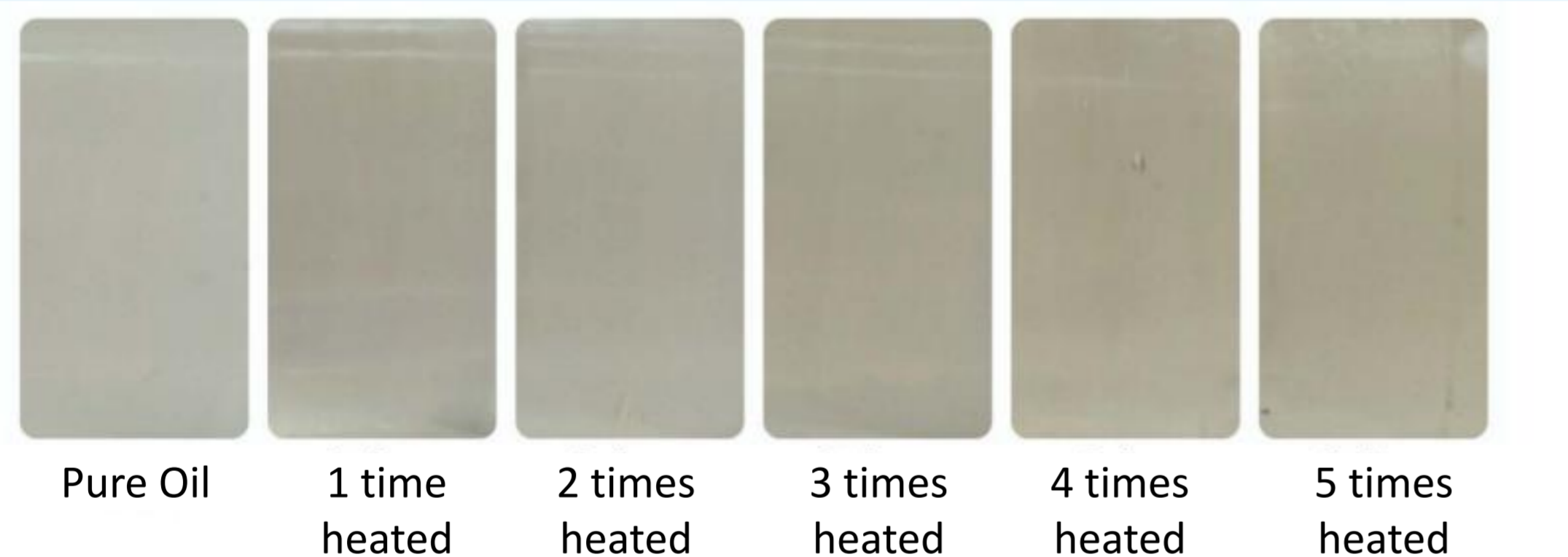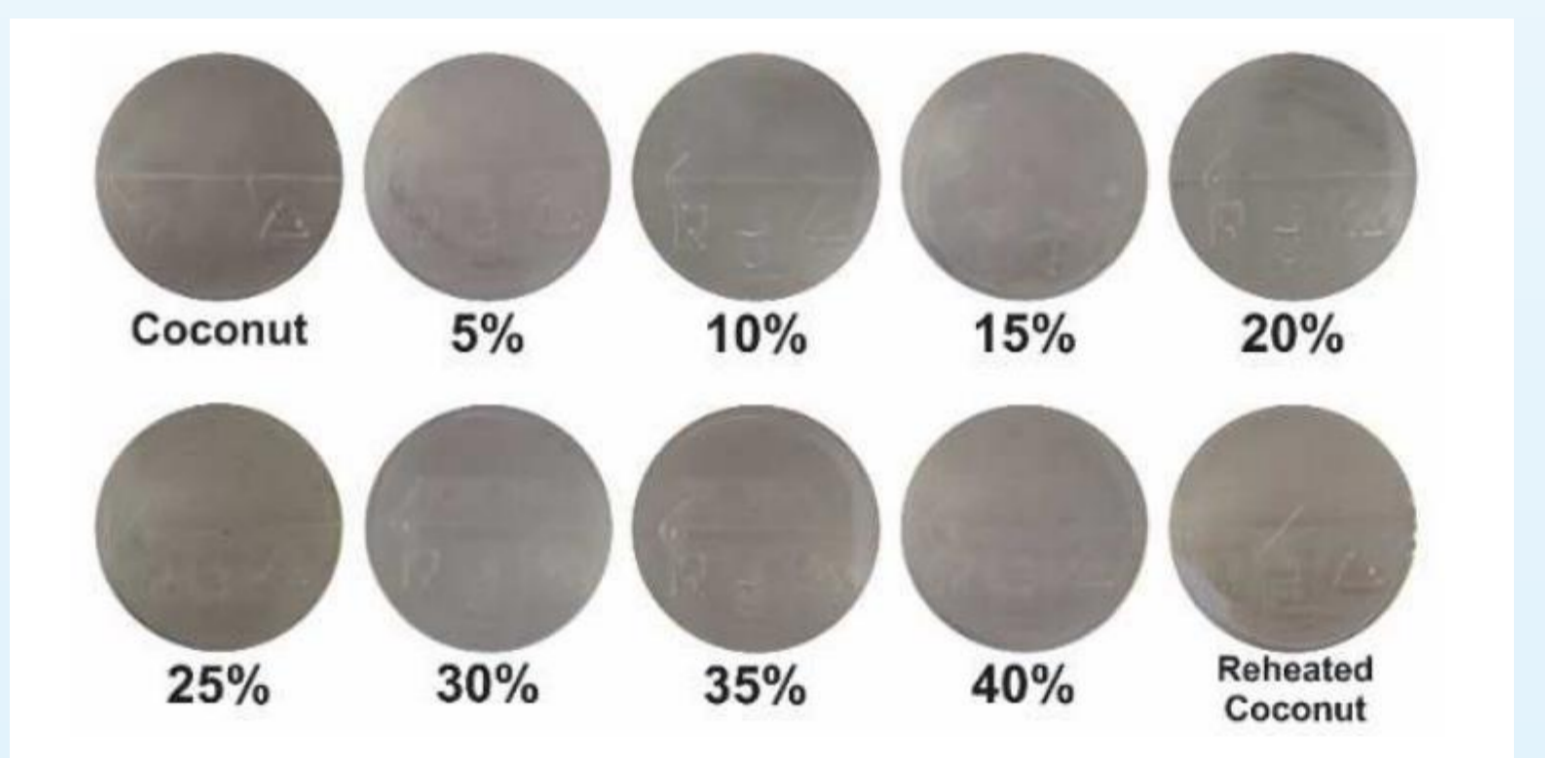
- Variation of Bhattacharyya distances with reheat cycle count classes.
- The SVM classifier yielded an accuracy of **83%** in identifying different reheat cycle count classes.

3. Transmittance Multispectral Imaging for Adulteration Assessment of Coconut Oil
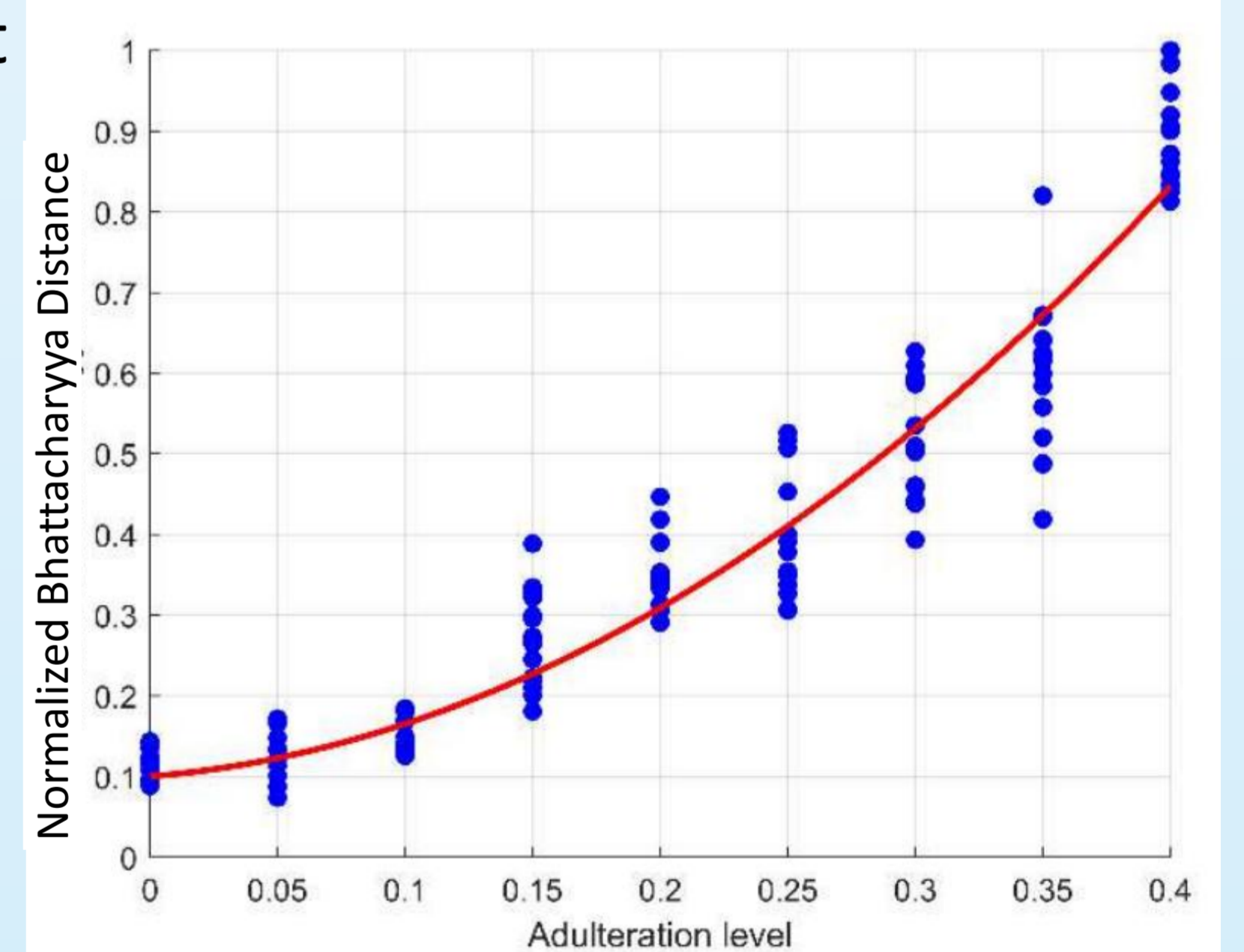
RGB images captured from different adulteration levels

Coconut | 5% | 10% | 15% | 20%
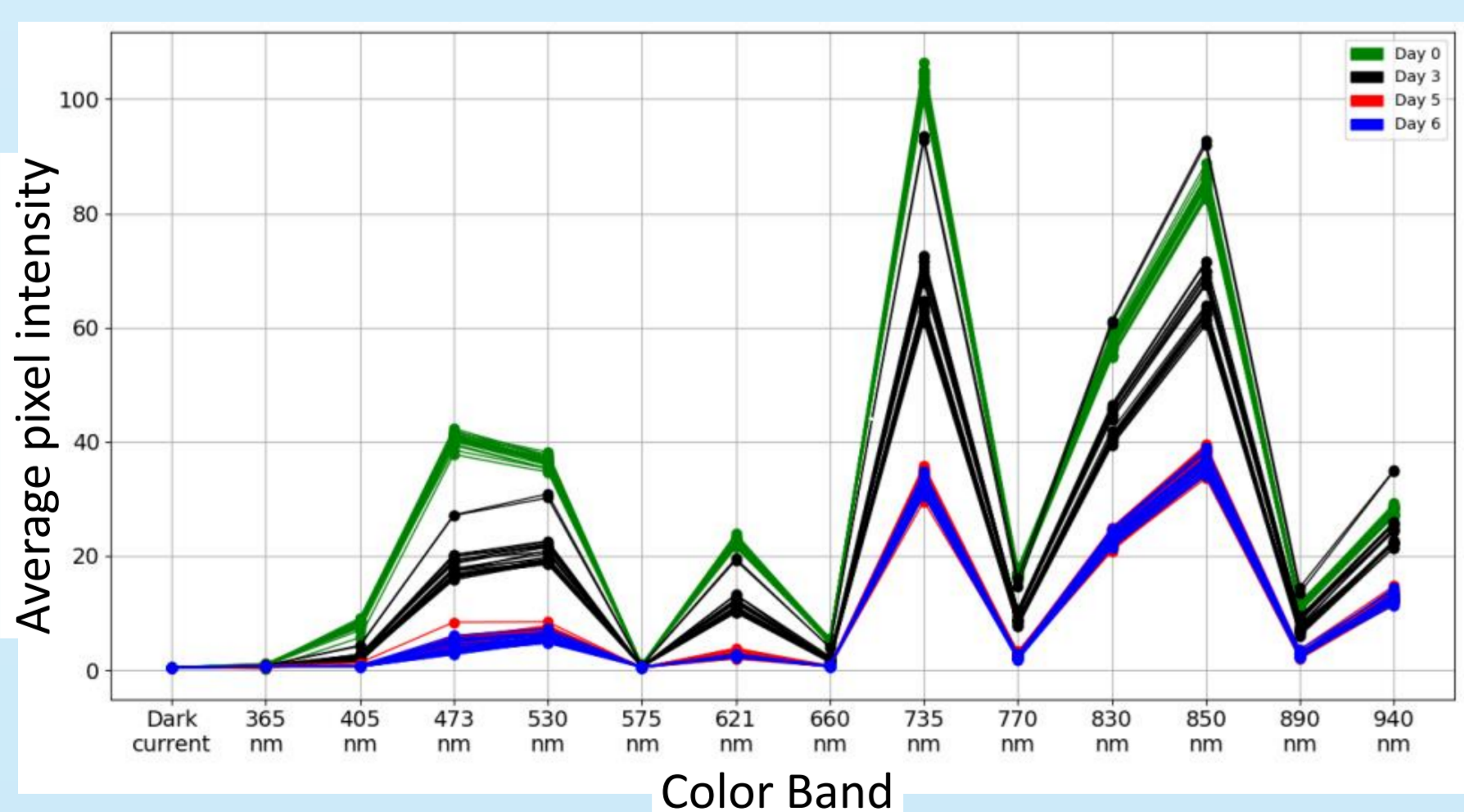25% | 30% | 35% | 40% | Reheated Coconut

- Mixing coconut oil with used coconut oil makes it carcinogenic, and increases LDL cholesterol causing obesity, weight gain, and heart diseases.

Variation of mean Bhattacharyya distance with reheated coconut oil adulteration level

## 4. Reflectance Multispectral Imaging for Fungal Growth Level Estimation

Aspergillus flavus

Developed classifier models are able to classify different fungal growth levels with a maximum of **96%** accuracy

5. Aflatoxin Contamination Level Estimation in Food Using Reflectance Multispectral Imaging-Based System

- Annually, 600 million suffer from illness due to consuming contaminated foods according to the WHO.

Fitted Curve: $y = 0.0238p + 0.4059 : R^2 = 0.9723$
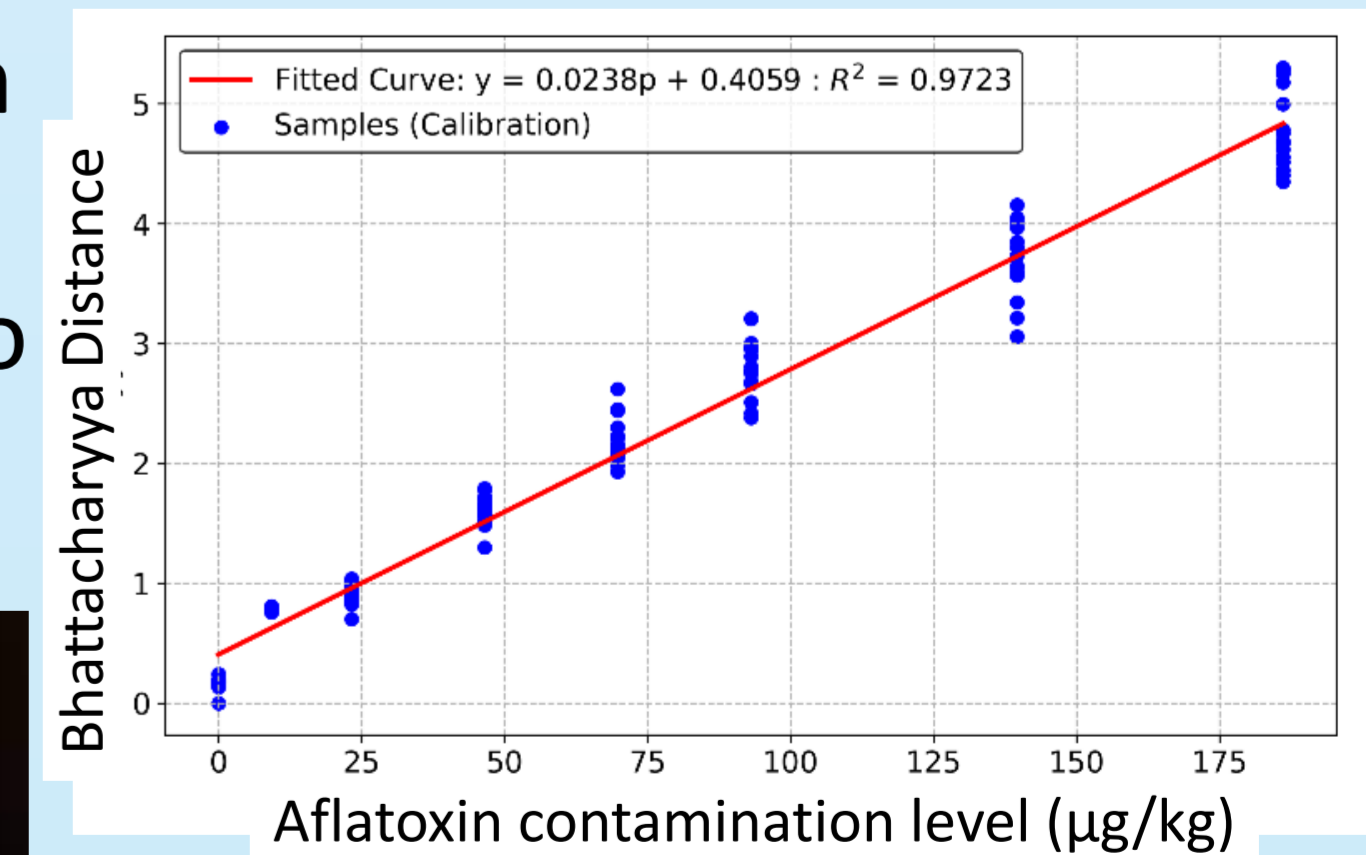
Developed classifier models are able to classify different levels with a maximum of **96%** accuracy

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