



4th Aquaphotomics International Conference

Monitoring of brown rot caused by *Monilia fructigena* on plums with the aquaphotomics approach

Flora Vitalis*, Juan Pablo Aguinaga Bósquez, Balkis Aouadi, Zsanett Bodor,
John-Lewis Zinia Zaukuu, Zoltan Gillay, Zoltan Kovacs

Hungarian University of Agriculture and Life Sciences, Institute of Food Science
and Technology, Department of Measurements and Process Control



Kobe
2021

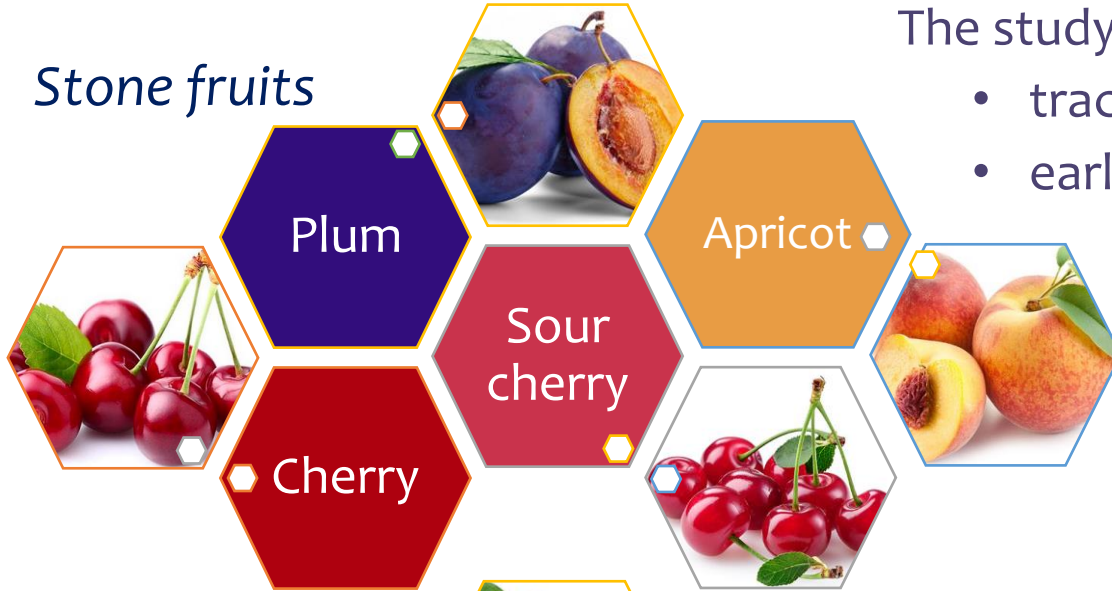


Introduction and Aims

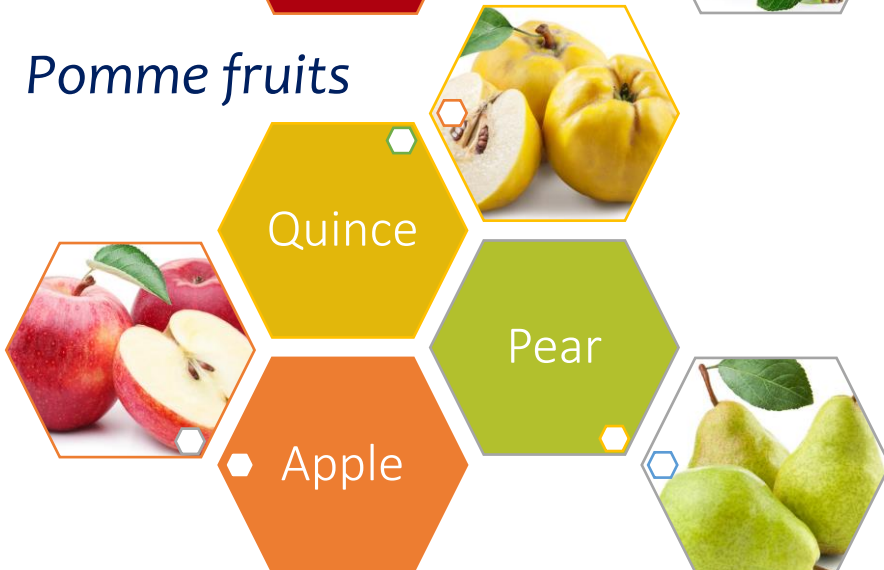
The study aimed to apply NIRS and aquaphotomics for

- tracking change in fruits stored under different conditions,
- early detection of *Monilia fructigena* infection.

Stone fruits



Pomme fruits



Monilia laxa



Monilinia fruticola



Monilinia fructigena



Typically occurring *Monilia* species causing brown rot

Materials and Methods

Fruit samples

Mode of inoculation with fungal mycelium (5 samples each):

- Control – disinfected fruit surface
- Injury – inoculation after 1 cm cut on surface
- Intact – inoculation on intact surface

Controlled storage for 8 days:

- Refrigerated ~ 3 °C
- Room temperature ~ 22 °C

Near-infrared spectroscopic measurements

- NIR-S-G1 hand-held reflectance spectrometer
- Spectral wavelength range: 900-1700 nm
- 5 measuring locations
- 3 consecutive scans
- Measurements twice a day

Data analysis

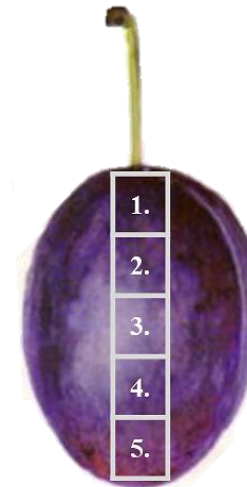
- Spectral pretreatments in the 1300-1600 nm range
- Principal component analysis - PCA
- Soft independent modeling of class analogies - SIMCA
- Aquagrams



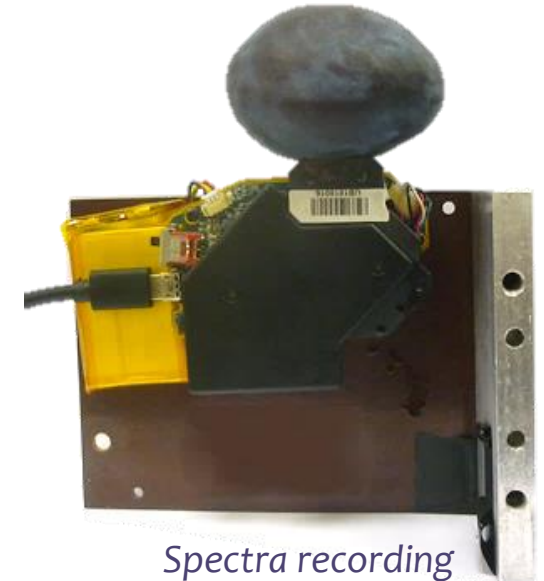
Monilia isolation process



M. fructigena isolates



Measuring locations



Spectra recording

Results – PCA and SIMCA

Visible signs after two days on injured plums stored at room temperature

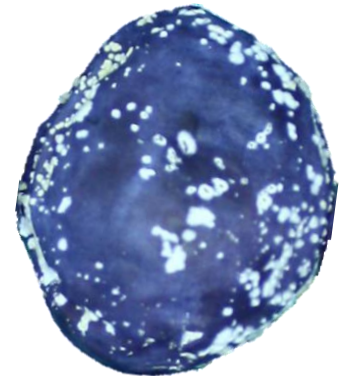
High variability in the results → optimization of spectral pretreatments

PCA

The results were influenced by the location of the spectrum acquisition on the fruit surface.

Soft independent modeling of class analogies

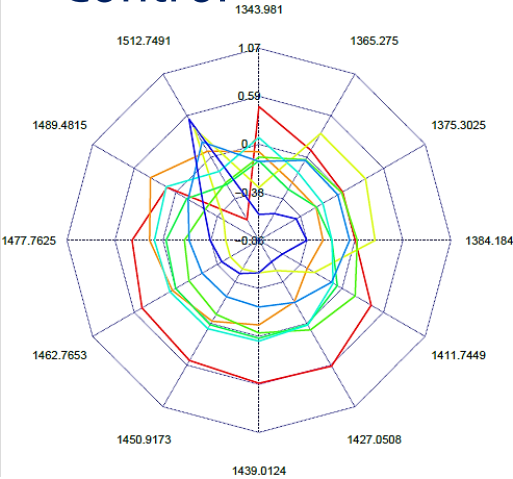
- Fruits stored at room temperature showed a crescent interclass distances.
- Injured plums had a larger interclass distance
- No incontrovertible distinguishability within sample groups
- Relevant wavelengths: 1393, 1403, 1415, 1446, 1484, 1539, 1571 nm



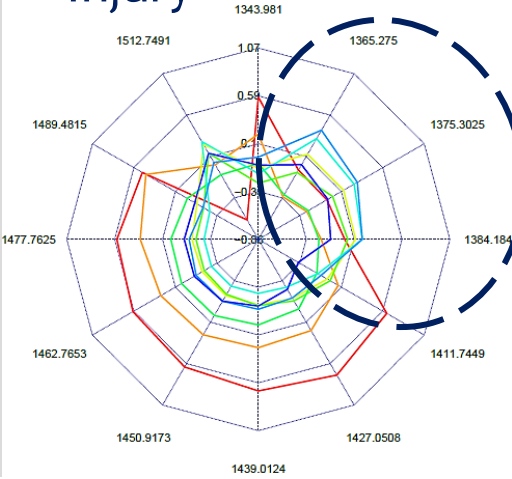
Results – Aquagrams

Refrigerator

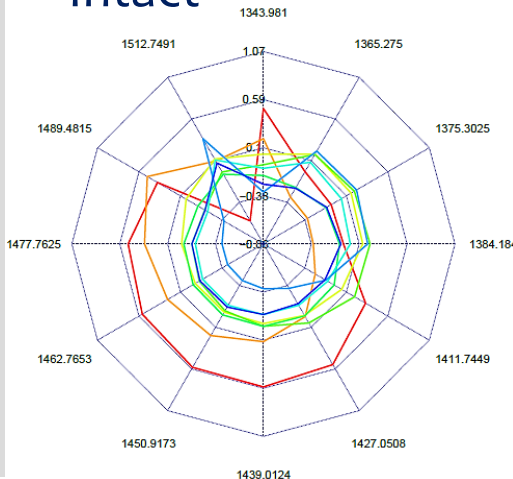
Control



Injury



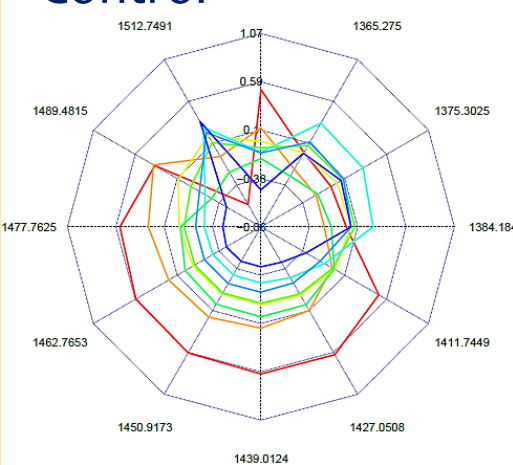
Intact



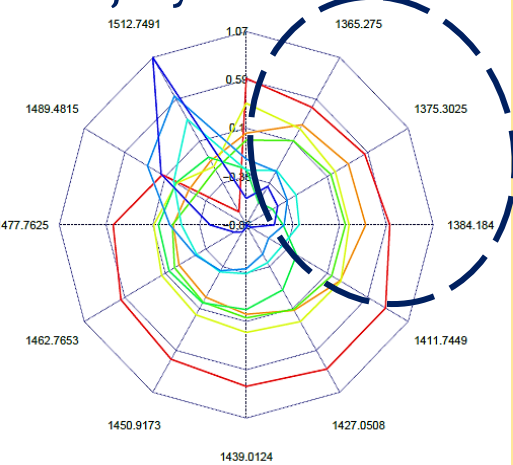
- Day 1
- Day 2
- Day 3
- Day 4
- Day 5
- Day 6
- Day 7
- Day 8

Room temperature

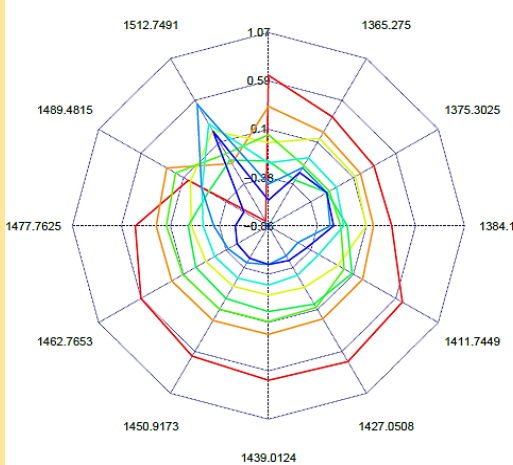
Control



Injury



Intact





Thank you for your attention!