SpectroFood: Information Agrifood quality estimation using hyperspectral techniques

SpectroFood.

Summary

- Digital technology solutions for nondestructive, reliable, real-time and cost-efficient food quality assessment
- Pre- and post-harvest stages

Four original use cases
- Apple (Germany)
- Broccoli (Greece)
- Leek (Belgium)
- Mushroom (Ireland)

Plus 6 additional ones
- Pineapple
- Onion
- Tomato
- Potato
- Chicory
- Banana

Broccoli glasshouse experiment
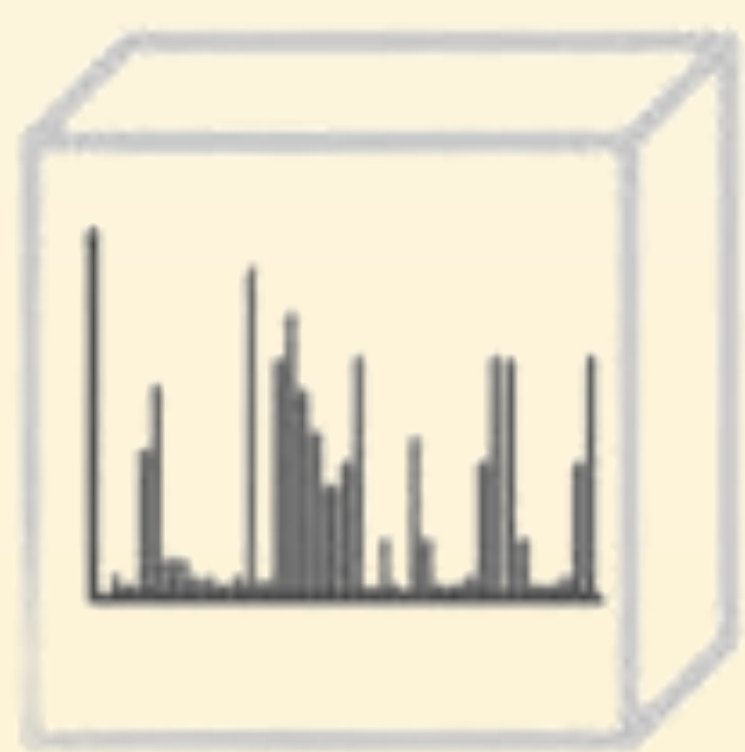
Main objective/ research question
- ⬇ food insecurity & ⬇food waste
- ⬆Input use efficiency (Water & Fertilizer)
- Nondestructive quality assessment research limited
- Focused on both pre- and post-harvest

Results

>20 Publications
- **Apple**: Dry matter, chlorophyll
- **Leak**: Dry matter, Post-harvest quality
- **Mushroom**: Dry matter, Browning
- **Broccoli**: Dry matter, Water stress, Fertilization
- **Pineapple**: Moisture, soluble solids, carotenoids
- **Banana**: Chlorophyll
- 3 review papers
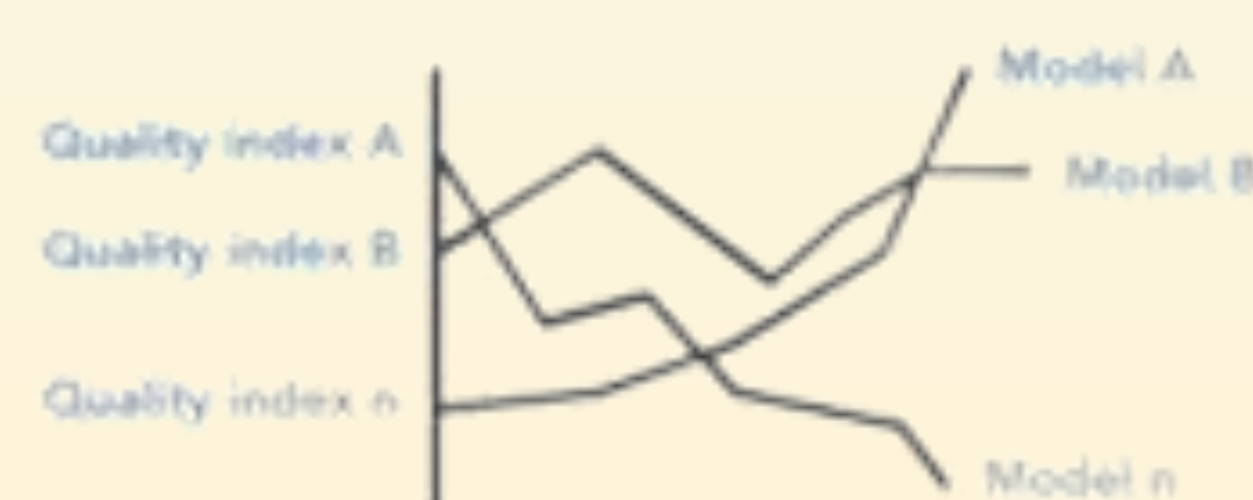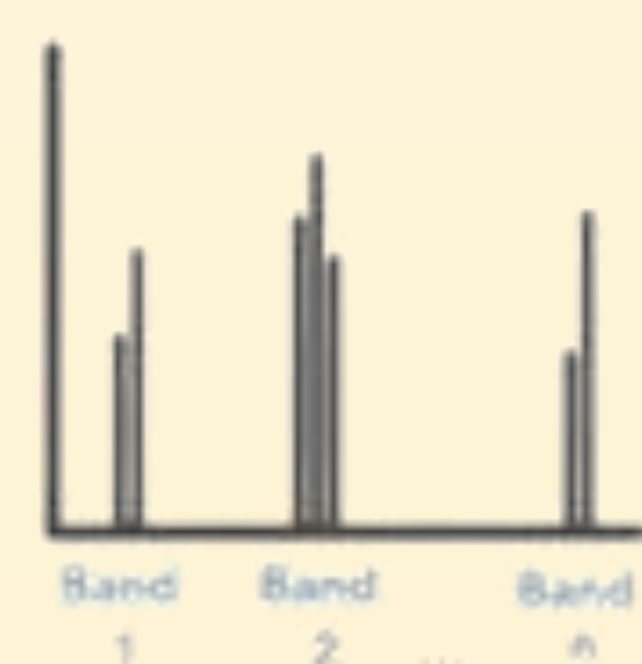- **Hyperspectral Dataset** for dry matter estimation (Apple, Leak, Mushroom, Broccoli)

HSI acquisition setup

Conclusions
- Limited data availability
- No data standards
- Limited generalization capabilities
- No of the shelf solutions
- Hyperspectral imaging can improve production systems

Future research activities
- Explore AI model generalization capabilities using larger hyperspectral datasets (e.g. SpectroFood dataset)
- Explore more complex AI algorithms (e.g. Transformers)
- Investigation of additional crops and quality parameters