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INTRODUCTION

Sweet and sour cherries are among the most nutritionally, culinary and industrially important stone fruits, harvested at different seasons depending on variety and intended use. The tests generally accepted in fruit production are largely based on empirical and destructive methods, which alone are not suitable to universally describe the physiological state of the fruits. Supplying fruit-based products of the required quality would not be possible without fruits of optimal harvest maturity.

This investigation aimed to non-invasively assess the ripeness of sweet and sour cherries of different cultivars to determine the optimal harvest time as opposed to the conventionally used quality control methods.

MATERIALS AND METHODS

Experimental fruit samples	Sweet cherry varieties		Sour cherry varieties	
		Bigarreau Burlat		Kántorjánosi
		Valerij Cskalov		Újfehértói
	Fruits harvested in different stages of ripeness			
	L1 – Unripe	No use		
	L2 – Coloration	No use		
	L3 – Intensive ripening	Canning		
	L4 – Ripe	Fresh/ frozen/ juice/ concentrate/ jam		
	L5 – Fully ripened	Fresh/ frozen/ juice/ concentrate/ jam		
	L6 – Over-ripe	Variable use		

I. Non-destructive near infrared spectroscopy

- ✓ Spectrum acquisition: 900-1700 nm range
- ✓ 2 measurement sides per fruit sample
- ✓ 3 consecutive scanning per measurement

II. Reference measurements

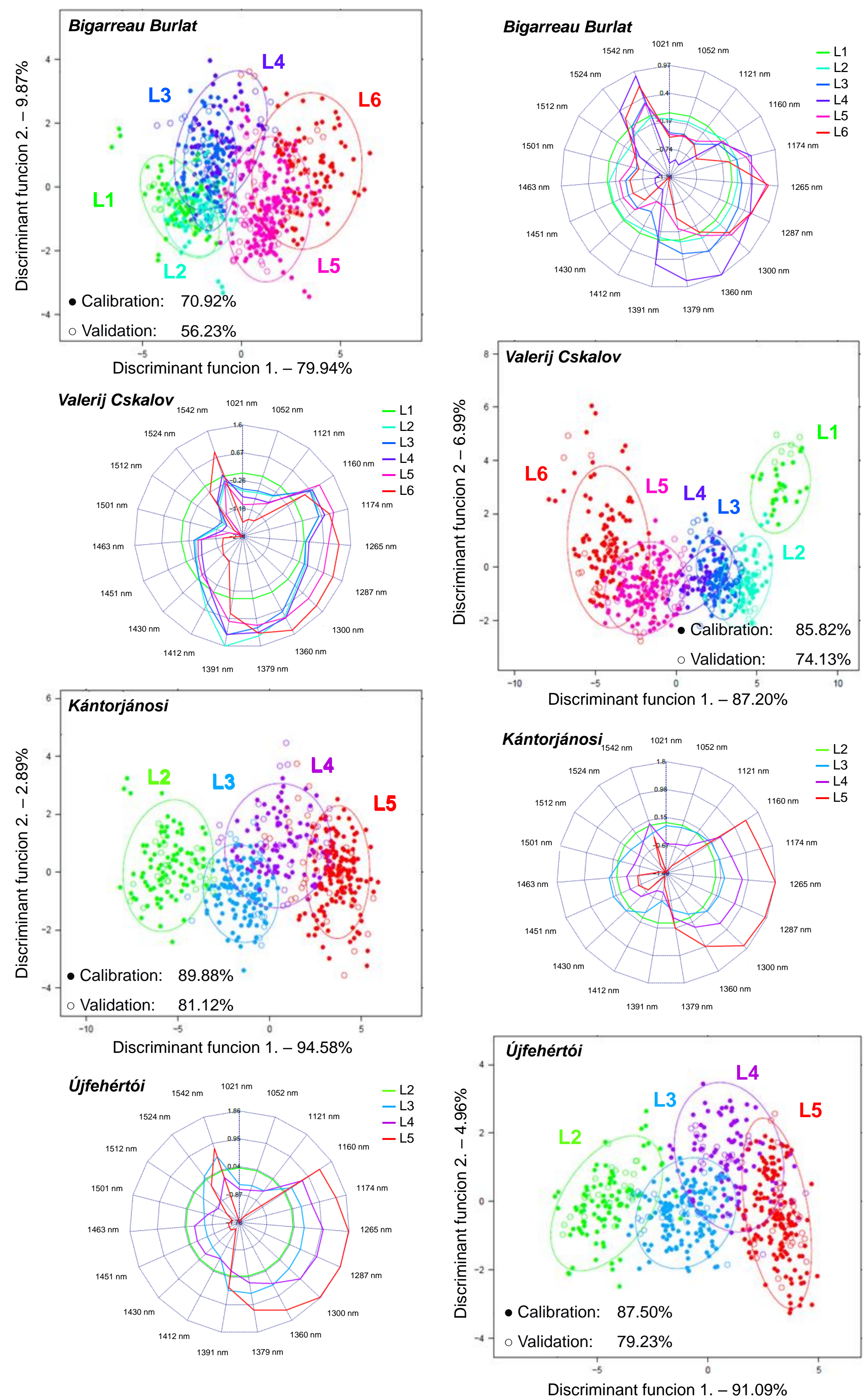
- Color coordinates (CIE Lab)
- Dry matter content (DMC)
- Soluble solid content (SSC)
- Titratable acidity (TA)
- Total anthocyanin content (AC)

Data analysis

Data evaluation in the 950-1650 nm range

- Spectral pretreatments**: Application of smoothing filter with scatter correction / detrending/ 1st or 2nd derivatives
- PCA – LDA**: Classification according to fruit ripeness based on the spectral data
- PLSR**: Prediction of fruit quality traits based on the spectral data

RESULTS



SUMMARISING REMARKS

Fruits harvested at different stages of ripeness were divided into 6 ripeness level for sweet cherries and 5 for sour cherries. PCA-LDA classification accuracies varied between 56–74% and 78–81% during model validation for sweet and sour cherry cultivars (see scatter plots above). The best-fitting PLSR models were found for L*, b*, SSC and AC with coefficients of determination between 0.6–0.9 during validation. The wavelengths, which have proven to be significant for describing the maturation process (see radar charts above), can be interpreted and can serve as a biomarker of cherry ripening.

ACKNOWLEDGEMENT

The research was supported by the European Union and co-financed by the European Regional Development Fund, and the Hungarian Government (GINOP-2.2.1-18-2020-00025). The research was supported by the Doctoral School of Food Science (MATE), and by the KDP-2021 Program (C1769369) of the Ministry for Innovation and Technology (Hungary) from the source of the National Research, Development and Innovation Fund.