

Comparative study of commercial cold-cuts used NIRS and sensory analysis

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Introduction

NEW SZÉCHENYI PLAN



- Healthy nutrition is a spreading trend
- Improvement of the nutritional science and the health-sound behaviour of consumers
- Sensory and chemical characterization of heat-treated meat products
- Sensory properties have primary importance from the aspect of consumer perception
- BUT: The ingredients are also highlight of food

Introduction

- Sensory analysis :

- Answer important questions during processing
- Help to elucidate production faults, to monitor the quality
- Help to compare production lots or differently developed products



- Need the chemical composition as well → near infrared spectroscopy → used widely in the food industry:

- Minimal sample preparation
- Give multitude information from a single spectrum
- Quantitative and qualitative analysis
- Estimation methods

The Purpose

This study aimed to classify commercial cold-cut sorts (Lyoner samples of different quality and price), based on sensory tests and NIR spectroscopy.



Material

sample code	price HUF/kg
1	1188 (cca. 4 Euro/kg)
2	941 (cca. 3 Euro/kg)
3	941 (cca. 3 Euro/kg)
4	710 (cca. 2.5 Euro/kg)
5	1878 (cca. 6 Euro /kg)

Sensory analysis

- Full profile analysis (MSZ ISO 6564:2001)
- 13 university students and teachers
- 10 cm long, unstructured scale
- SPSS 10.0. for Windows
- PanelCheck V.1.3.2. statistical softwares

NIR spectroscopy

•FOSS NIRSystems 6500 spectrometer equipped with:

OptiProbe fiber optic module

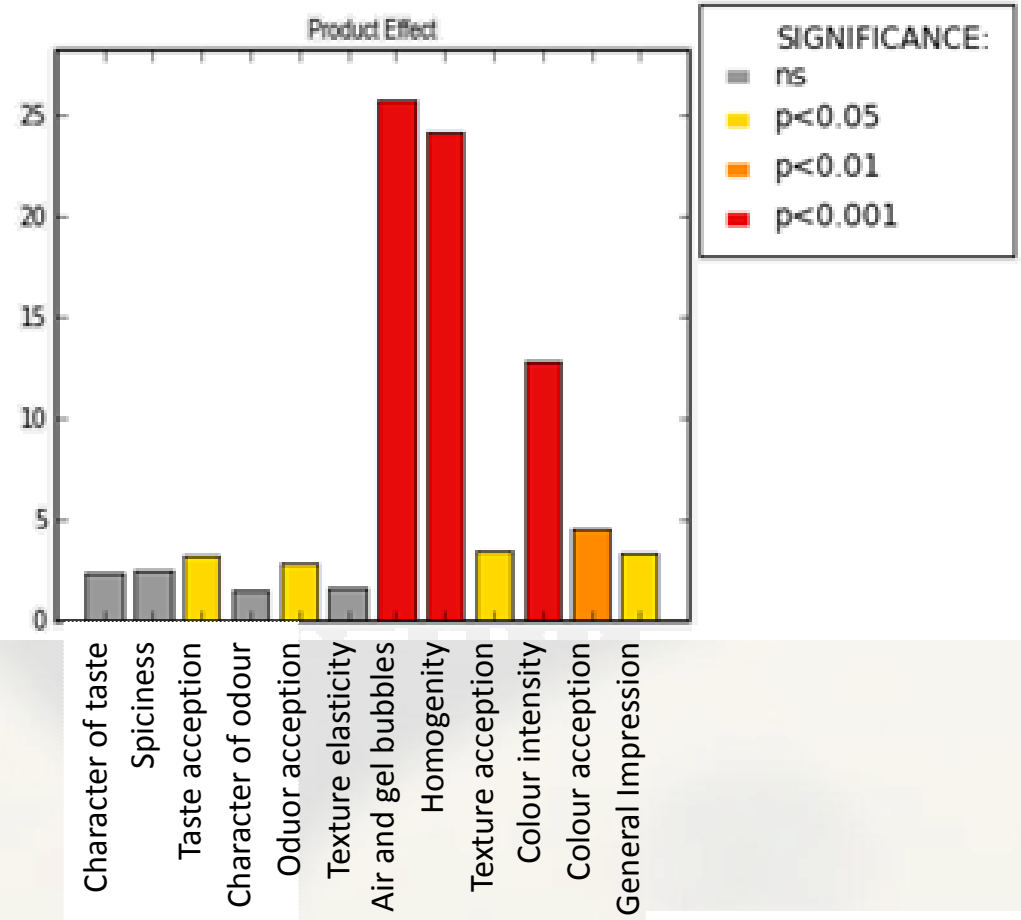
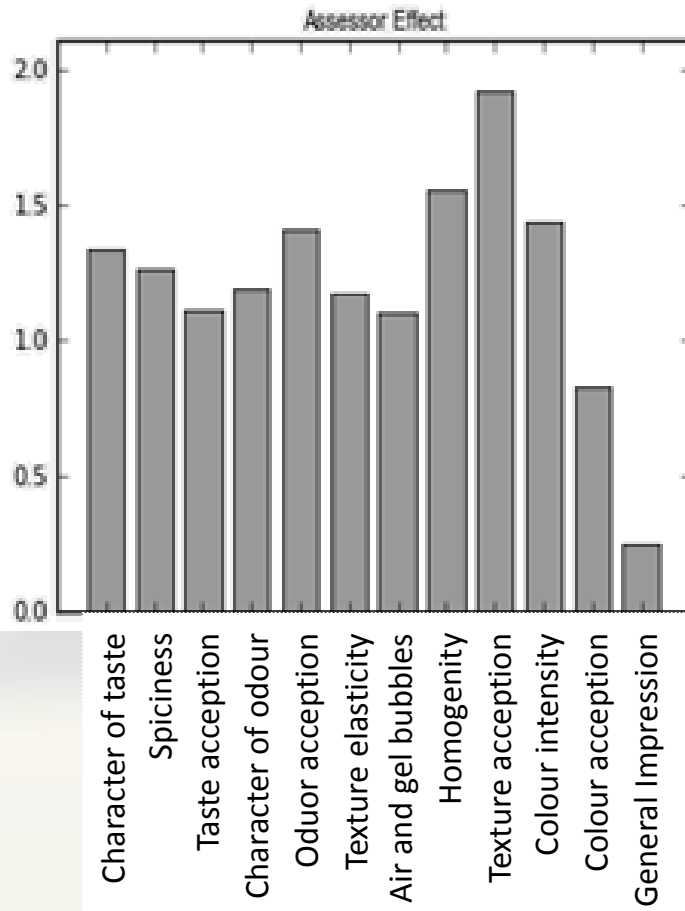
Regular Sample Transport Module (STM)

•WinISI II v1.5 spectral analytical software

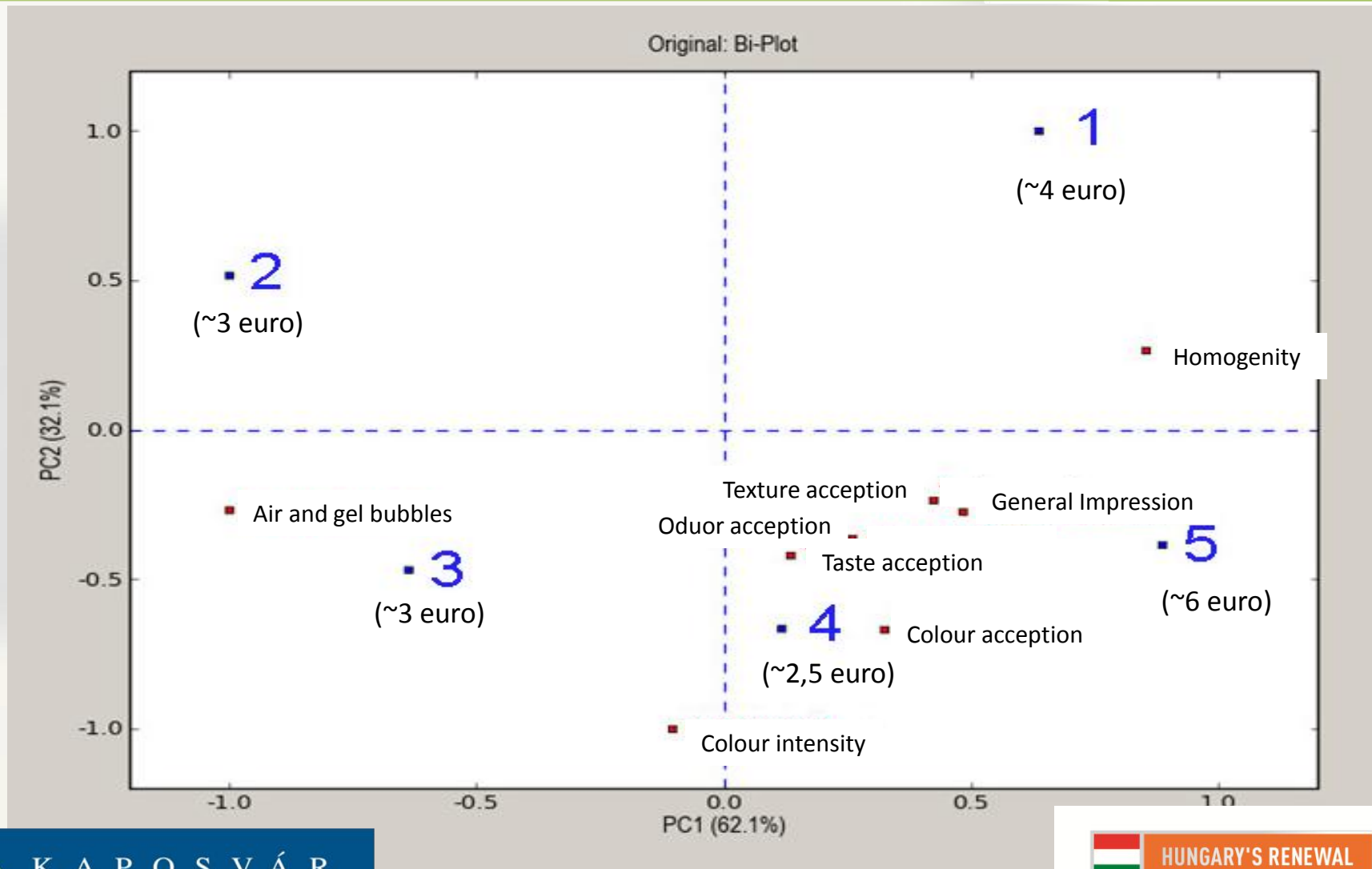
Results and discussion



Results of the Panel Check



PCA analysis of Sensory results



DFA analysis of Sensory results

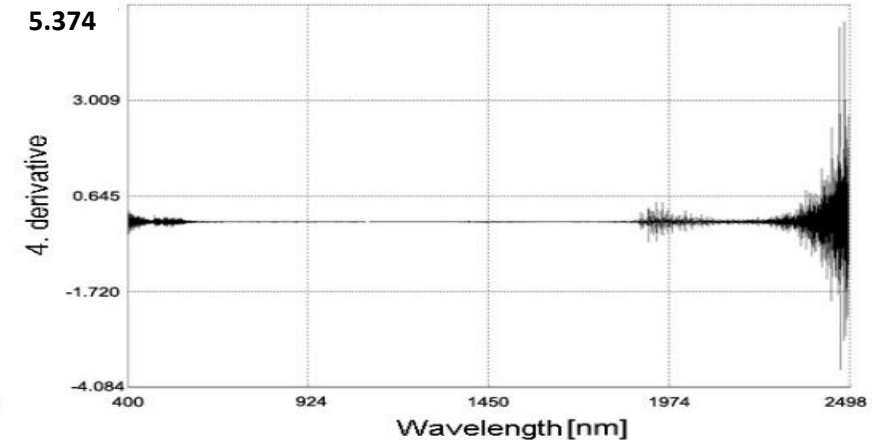
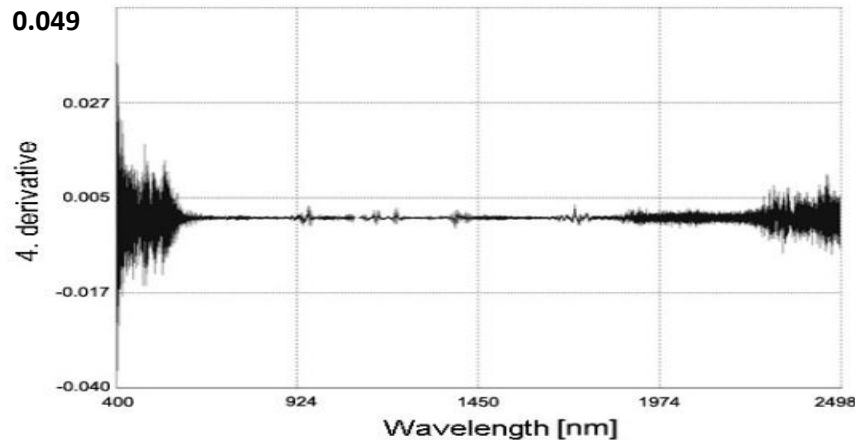
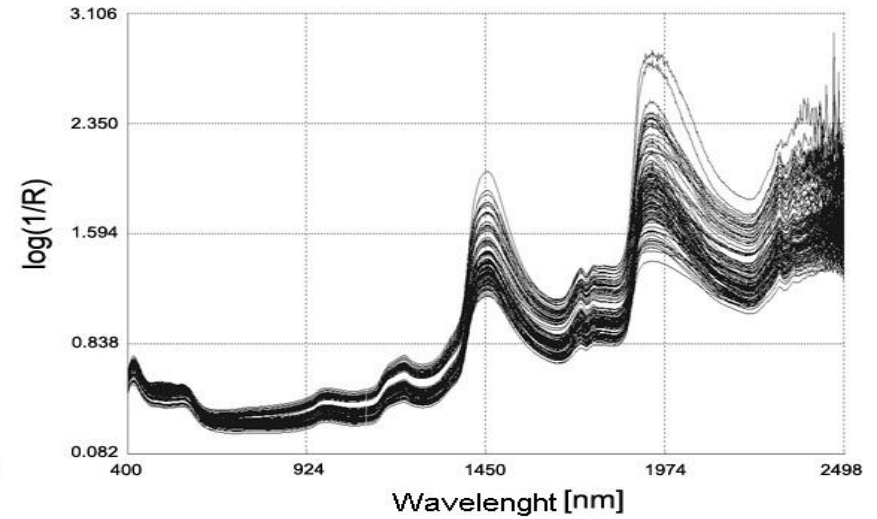
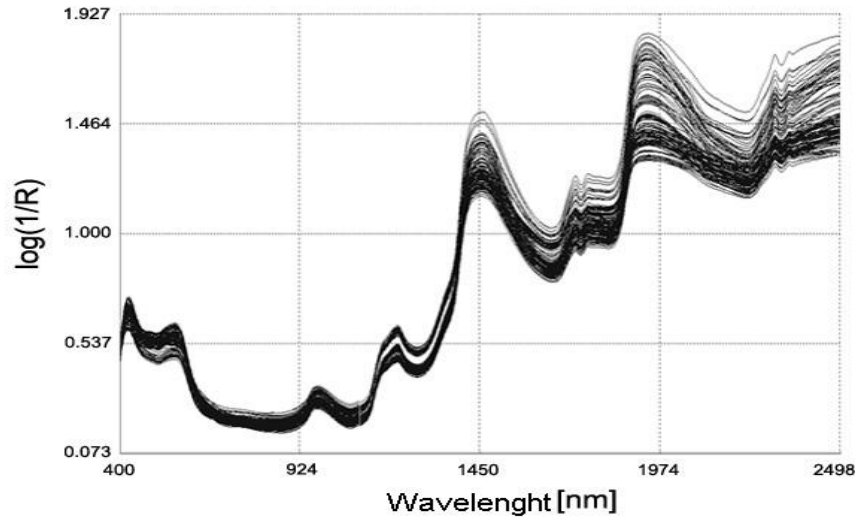
Group		1	2	3	4	5
Classification	1	81,8	0	0	0	18,2
	2	9,1	63,6	9,1	18,2	0
	3	0	9,1	81,8	0	9,1
	4	0	9,1	9,1	81,8	0
	5	18,2	0	0	9,1	72,7
Cross-validation	1	72,7	9,1	9,1	0	9,1
	2	9,1	36,4	36,4	9,1	9,1
	3	9,1	36,4	36,4	9,1	9,1
	4	9,1	9,1	18,2	45,5	18,2
	5	18,2	0	9,1	18,2	54,5

- **Classification: 76.3%**
- **Cross-validation: 49.1%**

Near Infrared Spectroscopy

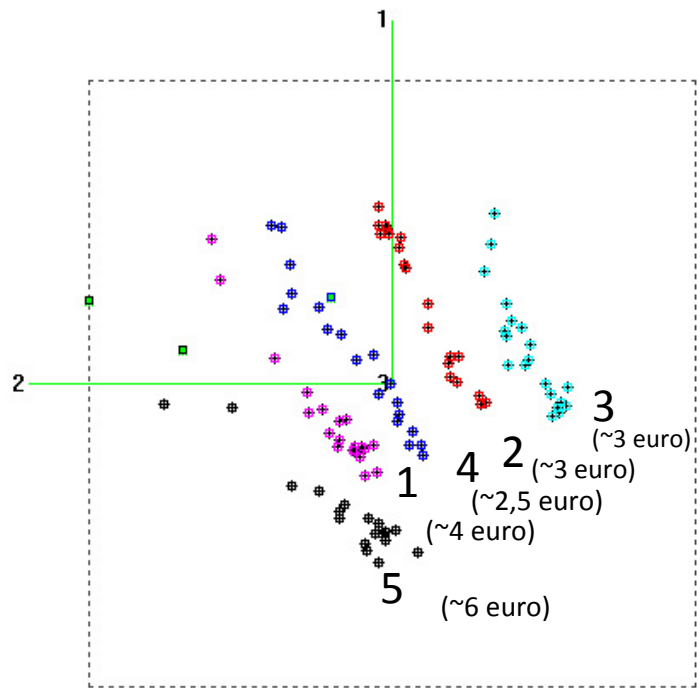
STM

Optiprobe

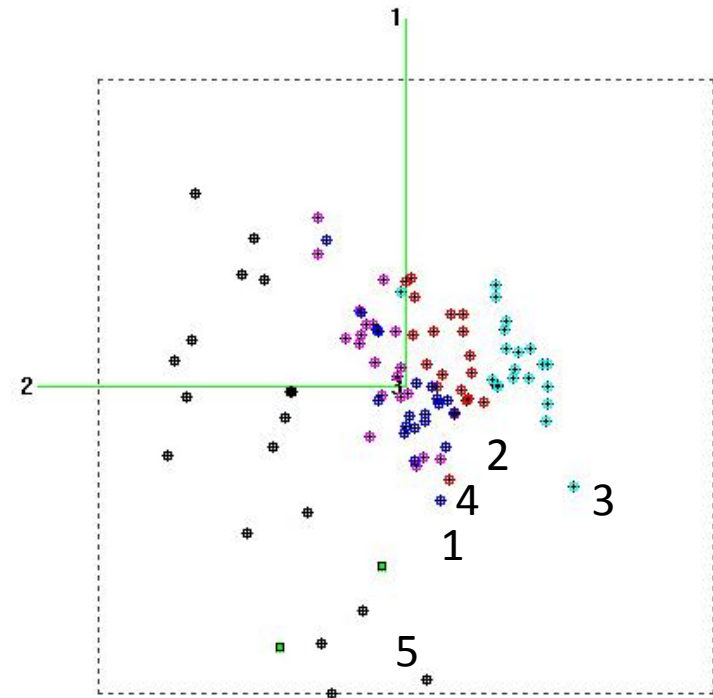


PCA analysis of Near Infrared Spectr results

STM



Optiprobe



Comparative table of the methods

	PCA	DFA (Cross-validation)
NIRS - STM	94%	98%
NIRS - Optiprobe	85%	71%
Sensory analysis	n.d.	49,1%

Summary

- Based on the human panel test, the cold-cut sorts of lower quality and price provide compromised homogeneity.
- In connection with this, panellists found air sacs and gel bubbles in these samples.
- The preference was markedly higher by samples of higher price-niveau, mostly attributed to the “overall impression” and “preference” characteristics.
- As compared to the discriminant factor analysis based on the sensory panel test, the NIR based classification was more successful.
- Latter method can be adapted to industrial processes even in an on-line manner, and provides a low-cost analytical possibility at high sample numbers.

Thank you for your attention

