INVESTIGATION OF PECTORALIS MUSCLE BY MEANS OF NEAR INFRARED SPECTROSCOPY IN BROILER AND MEAT TYPE TURKEY

G. BÁZÁR, P. HORN, L. LOCSMÁNDI, R. ROMVÁRI

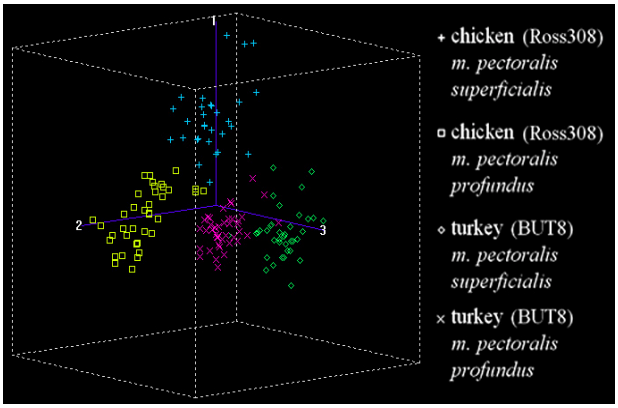
FACULTY OF ANIMAL SCIENCE
KAPOSVÁR UNIVERSITY, HUNGARY

THE GOAL OF OUR STUDY WAS TO ESTABLISH A NEAR INFRARED (NIR) METHOD TO DISCRIMINATE GROUND MEAT SAMPLES CONCERNING SPECIES OF CHICKEN AND TURKEY. IN ORDER TO TEST THE SENSITIVITY OF THE SYSTEM, THE POSSIBILITY OF DISCRIMINATION OF DIFFERENT MUSCLE TYPES OF EACH SPECIES WAS ALSO INVESTIGATED. FURTHERMORE, NIR CALIBRATION FOR FAT CONTENT OF CHICKEN PECTORILIS MUSCLE WAS AIMED.

Pectoralis muscle of 34 Ross308 broilers (6 weeks of age, both sexes) and 40 BUT8 turkeys (16 and 20 weeks of age, female and male, resp.) were investigated. Birds were kept on deep litter under closed, controlled conditions. Water and feed was offered *ad libitum*. Left breast meats were dissected in order to investigate superficialis and profundus pectoralis muscles respectively (total sample number: 148). Reflectance NIR spectra (1100–2500 nm) of homogenized fresh and freeze-dried muscles were recorded with a FOSS NIRSystem 6500 spectrometer.

Dry-matter-based fat content of each freeze-dried broiler muscles (n=68) was determined by wet chemistry.

Genotype		Prediction							
		Fresh				Freeze-dried			
		Ross308		BUT8		Ross308		BUT8	
	Muscle type	Superficialis	Profundus	Superficialis	Profundus	Superficialis	Profundus	Superficialis	Profundus
Ross308	Superficialis	33	1	3	0	30	0	0	0
	Profundus	0	33	0	2	4	34	0	1
BUT8	Superficialis	0	0	29	9	0	0	38	0
	Profundus	1	0	8	29	0	0	2	39
	Total	34	34	40	40	34	34	40	40
	Missclassified	1	1	11	11	4	0	2	1



Partial least squares regression (PLS-r) based discriminant analysis was applied for classifying the breast meat samples. Above results show that 83.8% of fresh and 95.3% of freeze-dried samples were placed into correct class during cross-validation, when identification was run by genotype and muscle type simultaneously. When only genotype was the classifying parameter, 100% of samples were recognized correctly, both in fresh and freeze-dryed form.

Results for identification of muscle types were 100% with fresh and freeze-dried chicken samples, but 77.5 and 98.8% with turkey in fresh and liofilized form.

Discrimintation by sex was 100% successful in turkey, but 75.5% in chicken by spectra of freeze-dried pectoralis superficialis muscle.

PLS-r based calibration equations were generated by using muscle types together or separately, for fresh and freeze-dried samples. Results of calibrations and full cross-validations are reported.

		Fat cont.	SEC	RSQ	SECV	1-VR
Fresh	Total (n=68)	3.18±2.28	0.70	0.91	0.92	0.84
	Superficialis (n=34)	5.01±1.88	0.82	0.81	1.04	0.70
	Profundus (n=34)	1.35±0.28	0.24	0.23	0.26	0.17
Freeze-dried	Total (n=68)	3.18±2.28	0.78	0.88	0.82	0.87
	Superficialis (n=34)	5.01±1.88	0.99	0.73	1.10	0.67
	Profundus (n=34)	1.35±0.28	0.20	0.51	0.23	0.36

Fat cont.: average of laboratory determined dry-matter-based fat content
SEC: standard error of calibration; SECV: standard error of full cross-validation
RSQ: coefficient of determination in calibration
1-VR: estimate of the fraction of explained variance during cross-validation

RAPID AND NON-DESTRUCTIVE NIR TECHNOLOGY IS APPROPRIATE FOR IDENTIFICATION OF MEATS OF DIFFERENT POULTRY SPECIES. CLASSIFICATION BY MUSCLE TYPES WAS SUCCESSFUL, SHOWING THE SENSITIVITY OF THE SYSTEM. FREEZE-DRIED SAMPLES ALWAYS GAVE BETTER RESULTS FOR DISCRIMINANT ANALYSES, THUS LIOFILIZATION IS USEFUL BEFORE RE-CHECKING MISCLASSIFIED SAMPLES. SEX WAS DETECTABLE IN TURKEY, BUT LESS IN CHICKEN, WHICH MIGHT BE BASED ON THE SMALLER GENDER ASSOCIATED DIFFERENCE. CALIBRATION FOR FAT CONTENT OF MEAT SAMPLES GAVE WEAK RESULTS, BECAUSE OF THE VERY LOW INTRAMUSCULAR FAT CONTENT AND THE HIGH BALANCE OF THE CHICKEN STRAIN. IT SEEMS, THAT BY SUCH A LOW VALUE AND VARIENCE OF CONSTITUENT, NIR CALIBRATION NEEDS HIGHER SAMPLE NUMBER.

Corresponding author: György Bázár, Faculty of Animal Science, Kaposvár University
H-7400 Kaposvár, Guba S. str. 40. (*e*-mail: bazar.gyorgy@ke.hu)