Potential use of a pocket near-infrared spectroscopy device to directly discriminate local chicken meat

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INTRODUCTION

Near-infrared spectroscopy (NIR) is widely applied for quantitative analysis for protein content, moisture, and fats in products of animal and vegetable. Furthermore, discriminant analysis makes it possible to use NIR for identification and control of sample purity/quality. In poultry industry, NIR has been applied to discriminate meat parts, genotype, and feeding.

This study aimed to evaluate the feasibility of a pocket-size NIR device to discriminate local poultry meat.

METHODS

Sample collection: At slaughtering, both thigh and breast were scanned and meat spectra were collected from 5 chicken breeds:

Robusta Maculata **(RM)**

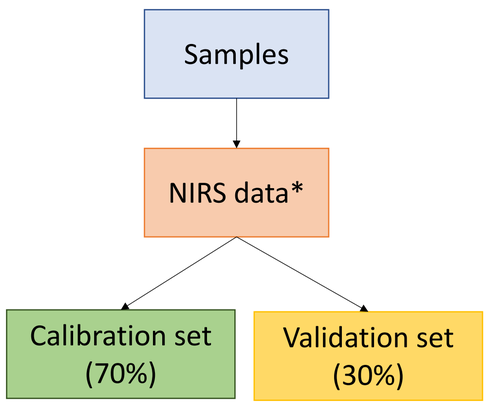
Bionda Piemontese **(BP)** and its capons **(CP)**

Bianca di Saluzzo **(BS)**

Millefiori Piemontese **(MF)**

Eureka **(EU)**

STATISTICAL ANALYSIS



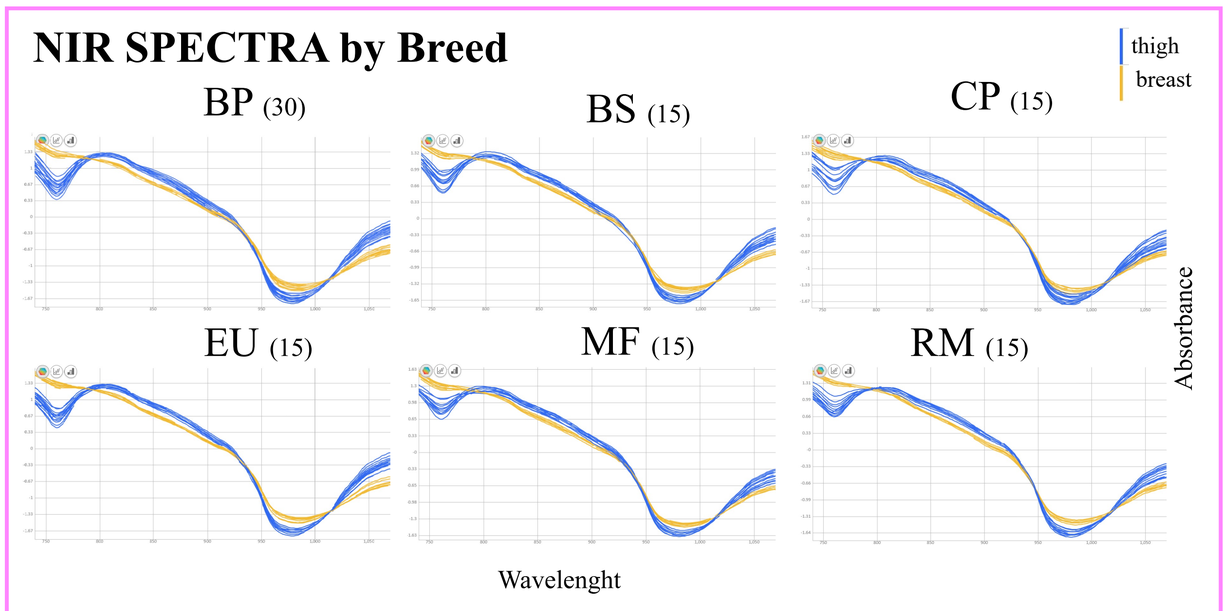
*Raw data +12 pre-treatment of the spectra (SNV, SG, D1, D2, W5, W11)

Partial least square regression discriminant analysis **(PLS-DA)** was performed on spectra using "caret" and "waves" package of R software v. 4.3.1.

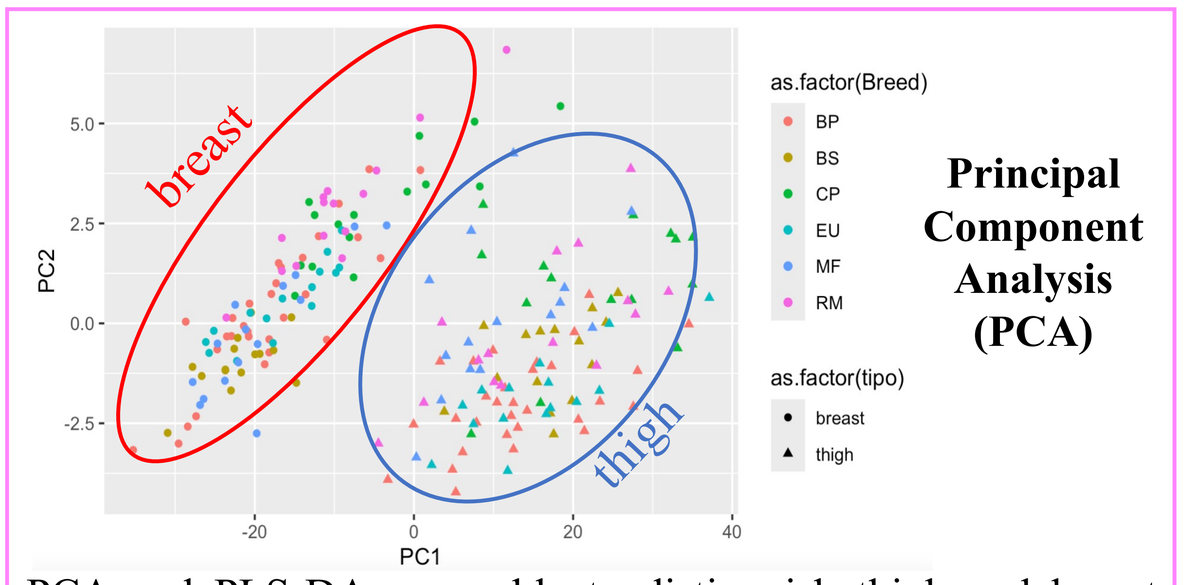
Principal Component Analysis **(PCA)** was used for discriminant analysis.

Dataset was split into calibration (70%) and validation (30%) set.

RESULTS



Raw spectra obtained using SCiO NIR device from thigh (in blue) and breast (in yellow) samples divided by breed.



PCA and PLS-DA were able to distinguish thigh and breast with >99% accuracy, but were not able to discriminate between breeds. Only PLS-DA correctly separated BP cockerel from its capons with >97% accuracy.

CONCLUSION

The results showed the potential of using a NIR portable spectrophotometer for distinguishing between chicken parts in the processing industry. In addition, pocket-size NIR can be used to identify meat from both entire and castrated animals.