Application Note APN02

Analyzing Meat & Meat Products using mylab NIR spectroscopy

Introduction

Meat is a valuable raw material, yet it is subject to natural variation. Fat, protein, and water content can vary significantly between animal species, suppliers, and individual batches. The challenge for meat processors is therefore to reliably produce products with consistent composition and quality despite variations in the raw materials.

The mylab NIR-Analyzer

The mylab NIR-Analyzer provides key information about the composition of meat, meat preparations, and sausage products in less than a minute. Raw materials can be characterized as early as the receiving stage and allocated to different production processes based on their composition.

During production, rapid measurements help ensure that product formulations and batches meet the desired target values. This makes the mylab NIR-Analyzer a fast and cost-effective alternative to a wide range of conventional wet-chemical laboratory methods.

Analyzing Meat & Meat Products

Minced meat, sausage products, or other meat products are placed in the sample dish, which is then positioned on the measurement field of the instrument. The sample measurement is completed within seconds, and the selected parameters are quantitatively determined.

Experimental

For analysis, approximately 150 g of minced meat, representing a pool of 200 to 1,500 different meat and sausage products, was placed in a sample dish. The sample was first measured using the mylab NIR-Analyzer and was subsequently sent to the reference laboratory (Prueflabor fuer Lebensmittel, fzmb GmbH) for chemical analysis.

The following parameters were determined: fat, saturated fatty acids, sugar, protein, ash, aw value, pH value, and MPDCP (meat protein devoid of connective tissue protein). The calibration models were generated using the reference values and the corresponding NIR spectra, as described in Schewtschenko et al.[1]



Fig.1. The mylab NIR-Analyzer with a sample of minced meat.

[1] *Calibration of the mylab NIR-Analyzer in Food Analysis. 2025. Schewtschenko O, Meuche F., Muecke A, Wietstock S, and Heise J. 2025. White Paper*

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Results and Discussion

To assess the performance of the mylab NIR calibration models, the coefficient of determination (R^2) was used. R^2 indicates how well the NIR-predicted values agree with the corresponding reference values. Values closer to 1 indicate a stronger agreement between predicted and reference values.

Table 1 summarizes the calibration statistics for four parameters measured in the different samples of meat and meat products: fat, protein, dry matter, and ash. The range represents the lowest and highest reference values included in the calibration dataset and indicates the concentration range covered by the calibration model.

The coefficients of determination (R^2) range from 0.99 for fat and dry matter, 0.97 for protein and 0.91 for ash. This demonstrates strong agreement between the NIR-predicted and reference values. Figures 2–5 show scatter plots of the NIR-predicted values versus the corresponding reference values for the four parameters.

Table 1. Statistics of mylab NIR-Analyzer measurements.

Parameter	n	Range	R^2
Fat (g/100g)	> 1500	1.1-51.7	0.99
Protein (g/100g)	> 750	3.5 - 32.4	0.97
Dry Matter (g/100g)	> 1000	15.2 - 73.4	0.99
Ash (g/100g)	> 200	0.7 - 5.7	0.91

Conclusion

This application note demonstrates that the mylab NIR-Analyzer is an effective tool for the rapid determination of key compositional parameters in meat and sausage products.

The NIR-predicted values for fat, protein, dry matter, and ash showed high correlation with the corresponding reference values, demonstrating the suitability of the system for rapid routine analysis.

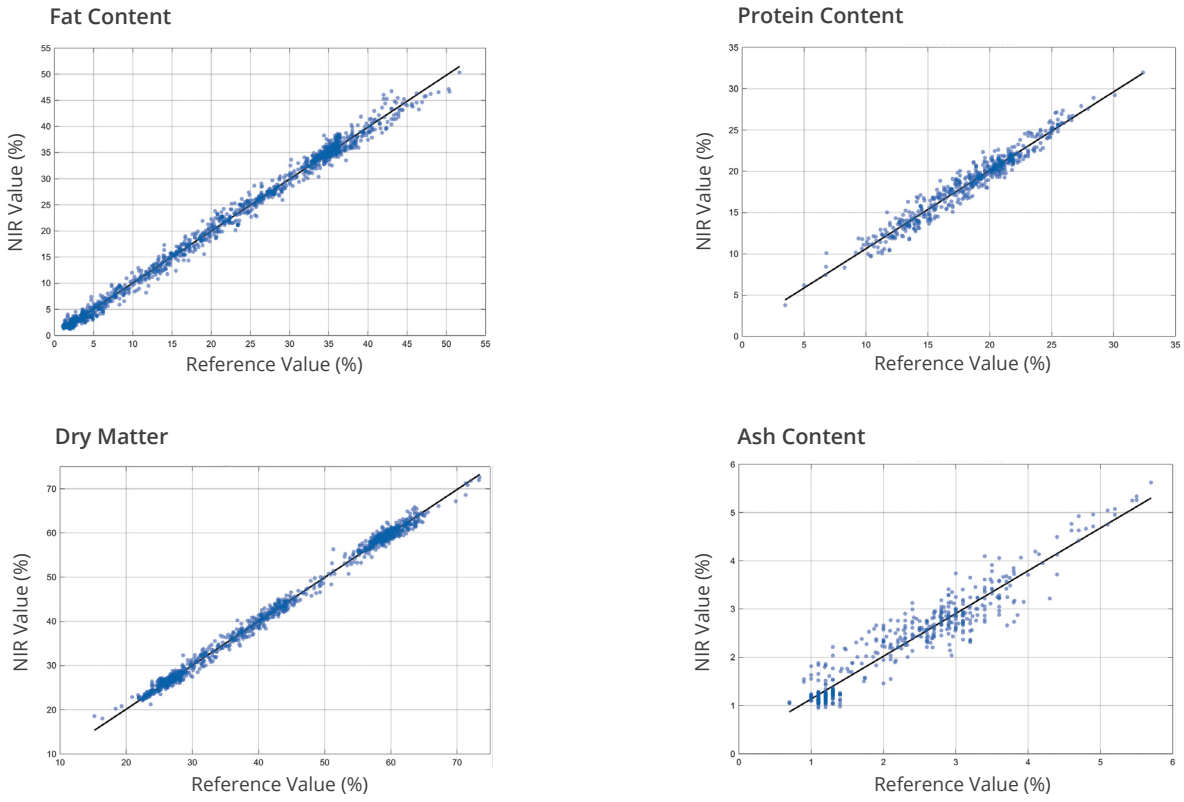


Fig. 2-5. Scatter plots of NIR-predicted and reference values for different parameters in meat samples. NIR values were acquired using the mylab NIR Analyzer, while reference values were obtained from the Prueflabor fuer Lebensmittel (fzmb GmbH).

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