

Determination of fatty acid groups in intramuscular fat of various local pig breeds by FT-NIRS

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The objective of the present study is to evaluate the potential use of FT-NIRS for predicting intramuscular fat (IMF) and fatty acid groups (MUFA; PUFA; PUFA n-3, PUFA n-6; SFA) on pig grounded muscles. The research considered 160 fresh samples of *Longissimus* collected from 12 European local pig breeds (TREASURE* project).

For every sample, lipids were extracted from IMF and fatty acid profile was determined by gas chromatography. Two aliquots of each sample were scanned using FT-NIRS Antaris II model. Mathematical pre-treatments (multiplicative scatter correction, 1st and 2nd derivative) were applied and outliers' spectra were identified and removed when necessary. Partial least square regression was used on the average spectrum and the models validated using an external data set. Results are evaluated in terms of coefficient of regression and root mean square errors in calibration (R^2 -RMSE) and validation (R_p^2 -RMSEP).

As expected, the best results were obtained for IMF with R^2 higher than 0.99 and RMSE lower than 0.2. Unsaturated fatty acids, probably due to the absorption of the *cis* double bond in a specific region of near infrared spectra, obtain acceptable R^2 (0.89 for MUFA and 0.75 for PUFA n-3 and PUFA n-6). SFA achieved a R^2 of 0.81 that is lower than values reported in other studies probably because of the large variability of genotypes used.

The validation models achieved both lower coefficients of determination and higher RMSEP than the calibration models; however, R^2 differences between calibration and validation were smaller than 5%, except for SFA.

Hence, the FT-NIRS seems promising to estimate the principal parameters of fatty acid groups on muscle samples from different European autochthonous pig breeds. Inclusion of other samples can improve the accuracy and the robustness of the models, especially considering the high variability of the samples.

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