

猪肉肌内脂肪含量的可见/近红外光谱在线检测 On-line Prediction of Intramuscular Fat Content in Pork Muscle with Visible/Near-infrared Spectroscopy

廖宜涛 樊玉霞 伍学千 成芳

浙江大学

关键词: 猪肉 肌内脂肪含量 在线检测 小波消噪 偏最小二乘法 可见/近红外光谱

摘要: 研究基于可见/近红外光谱分析技术的新鲜猪肉肌内脂肪含量在线检测。实验样本为208份背最长肌, 实验时样品以0.25 m/s的速度运动, 采集可见/近红外漫反射光谱, 进行小波消噪处理后, 结合不同的光谱预处理方法建立肌内脂肪含量的偏最小二乘回归模型。研究发现采用db6小波在6层分解后以极大极小原理选择阈值进行消噪效果较好; 消噪的光谱直接建立的PLSR模型预测性能较差, 经过多元散射校正、变量标准化及微分等预处理均能提高模型的预测性能; 变量标准化结合一阶微分预处理后建立的模型性能最佳, 校正集相关系数为0.892、验证集相关系数为0.834、校正集均方根误差为0.090、预测集均方根误差为0.080。结果表明可见/近红外光谱可用于肌内脂肪含量的在线检测, 但模型相对分析误差最高为1.738, 模型的精度和稳定性仍需进一步提高。 Prediction ability of visible/near-infrared spectroscopy for intramuscular fat content assessment on-line was studied. Totally 208 longissimus dorsi muscle samples were collected from different carcasses. Sample spectra were scanned while the samples were moving at the speed of 0.25 m/s. Wavelet transform was employed to eliminate the spectra noise. Partial least squares regression (PLSR) based on the de-noised spectra, combined with different pretreatment methods, was explored to predict intramuscular fat. Daubechies of vanishing moment 6 at decomposition level 6 with the minimax threshold gave good de-noising results. PLSR model based on the de-noised spectra without any pretreatment had poor prediction performances. And through pretreatment, including multiplicative signal correction (MSC), standard normalized variate (SNV) and derivative, the performances are improved. The first derivative spectral in conjunction with SNV yielded the best PLSR model with correlation coefficient of 0.892 and 0.834 in calibration and validation sets, respectively, alongwith root mean square error of calibration of 0.090 and root mean square error of 0.080 for validation. Results indicate that it is possible to predict intramuscular fat content on-line. However, the best ratio of the standard deviation to the SEP of the validation set (RPD) value was 1.738, and the accuracy and the robustness of the model needed further improvement for practical on-line application.

[查看全文 \(请使用Adobe Acrobat 6.0版本浏览\)](#) [返回首页](#)

[引用本文](#)