

梨可溶性固形物含量NIR与变量筛选无损检测 Measurement of Soluble Solids Content in Pear by FT-NIR Spectroscopy and Variable Selection

朱伟兴 江辉 陈全胜 郭建光

江苏大学

关键词: 梨 可溶性固形物含量 近红外光谱 间隔偏最小二乘 遗传算法

摘要: 为提高利用近红外光谱技术快速检测梨可溶性固形物含量的精度和稳定性, 结合区间偏最小二乘和遗传算法(iPLS-GA)来筛选校正模型中的特征光谱区和变量, 通过交互验证法确定模型中的主成分因子数和筛选的变量, 并以预测均方根误差(RMSEP)和相关系数(Rp)作为模型评价标准。试验结果显示: iPLS-GA最优模型包含5个光谱区、50个变量和10个主成分因子。最佳预测模型相关系数(Rp)和RMSEP分别为0.939 8和0.325 0, 研究结果表明近红外光谱结合iPLS-GA算法可以准确、无损检测梨的可溶性固形物含量。In determination of soluble solids content (SSC) in pear by FT-NIR spectroscopy technique, in order to improve precision and robustness, interval partial least square coupled with genetic algorithm (iPLS-GA) was used to select the efficient spectral regions and variables in calibrating model. Selections of spectral regions and variables were implemented by the cross-validation. The performance of the final model was evaluated according to the root mean square error of prediction (RMSEP) and correlation coefficient (Rp) in prediction sets. The results of final model were achieved as follow: the optimal iPLS-GA model was obtained with 10 PLS factors, when 5 spectral regions and 50 variables were selected, respectively. Rp and RMSEP of optimal model was 0.9398 and 0.3250 respectively by a prediction set. This work demonstrated that NIR spectroscopy with iPLS-GA could be applied successfully to determine the SSC in pear as a precise and nondestructive method.

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