鸡粪工厂化堆肥过程中有机质含量预测模型 Prediction Model for Organic Matter Content in Chicken Manure during Plant-field Composting

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关键词： 鸡粪 工厂化堆肥 有机质 理化指标 近红外光谱

摘 要： 以148份肉鸡粪和菊花渣工厂化高温堆肥过程样品为研究对象，分别探讨了基于基本理化指标和近红外光谱预测鸡粪堆肥过程中有机质含量的可行性。根据样品中干物质含量、pH值和电导率3种理化指标与有机质含量的相关关系建立了基于理化指标预测有机质含量的一元和二元线性回归模型。结果表明，利用干物质含量预测有机质含量简便、易行且最具实际应用价值（R2=0.81, P<0.001）。采用多元线性回归、主成分回归和偏最小二乘回归3种定量分析方法分别建立了鸡粪堆肥过程有机质含量的近红外预测模型。其中，主成分回归和偏最小二乘定量分析方法所得预测模型的验证决定系数（r2）均为0.95，验证相对分析误差（RPD）均大于4.0，所建模型的预测精度较高，可用于实际检测工作。 The objective of this study was to explore the feasibility to estimate organic matter (OM) content in chicken manure during aerobic composting. Two types of regression methods were used with physicochemical properties and near-infrared spectroscopy (NIRS). Single and two variable linear regressions between the values of dry matter (DM), pH value, electrical conductivity (EC) and OM content were developed. Results showed that it was significant in practice to estimate the OM content using DM value with a higher coefficient of determination (R2=0.81, P<0.001). In addition, multiple linear regression (MLR), principle component regression (PCR) and partial least square regression (PLS) were used to develop NIRS models for OM. It was observed that the both models of PCR and PLS were robust with the coefficient of determination in validation set r2=0.95, respectively. And both the ratios of standard deviation of validation set to root mean square error of prediction (RPD) are greater than 4.0.

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