基于激光诱导荧光光谱分析的黄瓜叶片叶绿素含量检测　Detecting of Chlorophyll Content of Cucumber Leaves Based on Laser-induced Fluorescence Spectrum Analysis Technique

杨昊谕 于海业 张蕾 隋媛媛

吉林大学

关键词：　叶绿素含量 激光 叶绿素荧光 无损检测 反射光谱

摘　要：　利用反射式激光诱导叶绿素荧光光谱分析技术对黄瓜活体叶片叶绿素含量进行检测实验研究。通过对中心波长为473 nm和660 nm 2种激发光的4种激发强度（2.5、5.0、7.5、10.0 mW）条件下荧光光谱的分析，结果显示：在强度7.5 mW、波长473 nm的光源下激发产生的荧光光谱具有很好的准确性和稳定性；在此条件下，荧光参数F732/F685与植物活体叶片内叶绿素含量成极显著线性关系，并以此为基础建立了数学回归模型 （R2>0.93，p<0.001），模型回归系数显著，模型可靠性极好，准确地反映了荧光参数与叶绿素含量的关系。Chlorophyll content of cucumber leaf in vivo was detected by reflectance laser-induced fluorescence (LIF) spectrum analysis technique in this research. Fluorescence spectrums, which was induced by four power (2.5 mW, 5.0 mW, 7.5 mW, 10.0 mW) of center wavelength 473 nm and 660 nm laser respectively, were analyzed in the experiment. Results showed that the fluorescence spectrum has a favorable precision and stability under the condition of 7.5 mW and 473 nm laser, and there is a significant linear correlation between the ratio of chlorophyll fluorescence at 732 nm to 685 nm (F732/F685) and the chlorophyll content. Furthermore the regression model was established (R2>0.93, p<0.001) in this excitation light source condition. This research doesn't only extend the scope of the application of chlorophyll fluorescence detection technology, but also provides a theoretical basis of the development of portable and non-destructive plants chlorophyll content detection equipment.

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