

桃叶片中花青苷含量与叶绿素含量的相关关系

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摘 要: 测定‘筑波3号’桃(叶红色)和山桃(叶绿色)叶中花青苷和叶绿素含量的结果表明: 随着叶位的升高, 筑波3号叶中花青苷与叶绿素b的含量均升高; 而山桃叶中花青苷含量几乎为0, 叶绿素b含量无变化。叶绿素b含量与花青苷含量呈极显著正相关($P < 0.001$)。测定单位面积叶片紫外光和可见光吸收能力的结果表明, 二者的紫外光吸收能力相近, 而筑波3号的绿光吸收能力大大强于山桃。

关键词: 花青苷; 叶绿素; 桃; 绿光; 紫外光

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1 目的、材料与方法

植物叶中同时存在花青苷和叶绿素时叶片呈现红色和紫红色。花青苷的存在对叶绿素有何影响尚未见报道。本试验测定叶片为红色的‘筑波3号’桃(*Prunus persian* Batsch.)和叶片为绿色的山桃(*Prunus davidiana* Franch.)叶片中花青苷与叶绿素含量的变化及其相关性, 为探讨花青苷的生理作用提供依据。

2000年6月22日从试材实生苗主干中部向上取叶, 测其花青苷和叶绿素的含量。2000年7月2日取幼树新梢中部叶, 提取紫外光和可见光吸收物质, 然后用760MC紫外可见分光光度计在250~380 nm和400~700 nm范围内对提取液进行波长扫描。花青苷含量的测定: 用0.1%的盐酸甲醇浸提叶片2 h后, 测657 nm、530 nm处的吸光度^[1,2]。叶绿素含量测定参考文献[3]。叶片紫外吸收能力测定参考文献[4]。叶片可见光吸收能力测定: 取叶剪碎, 用0.1%的盐酸甲醇浸提2 h, 然后用760MC型紫外可见分光光度计在400~700 nm波长范围内进行扫描, 得其图谱。

2 结果与分析

2.1 花青苷含量与叶绿素含量的关系

由图1可见, 随着叶位的升高, 筑波3号叶中花青苷的含量持续升高, 而山桃叶中花青苷的含量近乎为0。叶绿素a的含量略升高; 叶绿素b的含量在筑波3号中随叶位的升高含量上升, 在山桃中变化不大。相关分析显示, 叶绿素b含量与花青苷含量呈极显著正相关, 显著水平达0.001。

2.2 筑波3号桃和山桃叶片紫外光和可见光吸收能力的比较

从试材叶片紫外光和可见光吸收能力的比较可以看出, 二者的紫外光吸收能力相近(图2); 筑波3号桃的叶片厚度(0.17 mm)比山桃的(0.23 mm)小, 但单位面积上吸收紫外光的能力与山桃相近。在可见光范围内, 筑波3号叶片的绿光吸收能力远高于山桃; 而在红光区, 筑波3号的吸收能力略低于山桃(图2)。推测叶绿素b与花青苷的相关性与其紫外吸收特性无关, 而与其绿光吸收特性有关, 其生理作用和机制需进一步探讨。

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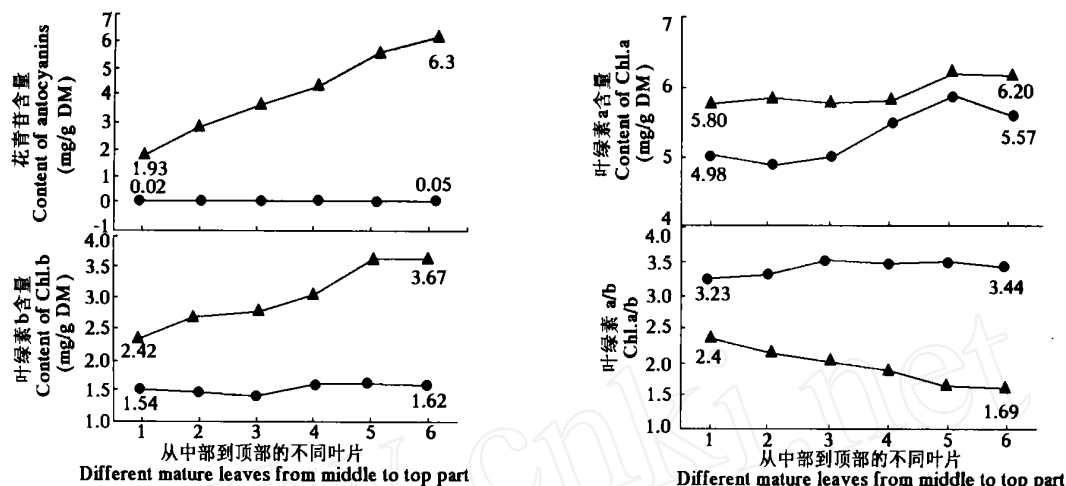


图1 筑波3号() 和山桃() 实生苗从中部到顶部不同成熟叶片中花青苷和叶绿素的含量变化
Fig. 1 Changes in anthocyanins and chlorophyll in different mature leaves From middle to top part of 3-month-old 'Tsukuba NO. 3' () and David peach () seedlings

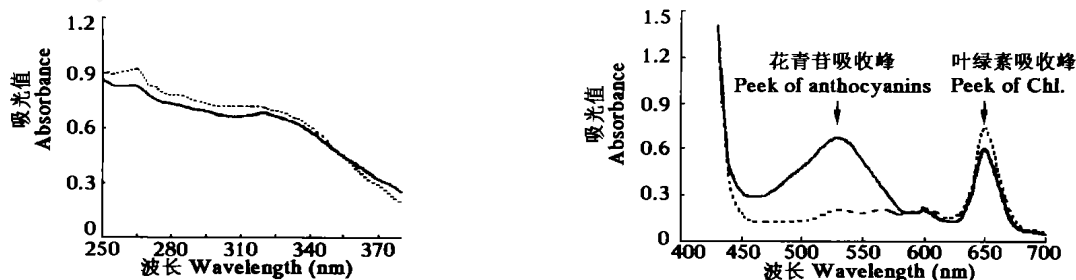


图2 筑波3号桃() 和山桃() 叶片的紫外和可见光的吸收光谱
Fig. 2 UV and visible-light absorption spectra of 'Tsukuba 3' () and David peach () leaves

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Correlations of Anthocyanins and Chlorophyll in Peach Leaves

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Abstract: The concentrations of anthocyanins and chlorophyll b in the different mature leaves of 'Tsukuba 3' and David peach have been investigated. The results showed that, with the elevation of leaf-position, in the 'Tsukuba 3' peach leaves, anthocyanins and chlorophyll b contents increased. While in David peach leaves, there was very low content of anthocyanins without variation, and the content of Chlorophyll b varied very little. The results of correlation analysis showed that Chlorophyll b content had a remarkable positive correlations with anthocyanins content ($P < 0.001$). The UV and were identified. The results visible light absorbing capabilities of 'Tsukuba 3' and David peach leaves howed that, the UV-light absorbability of 'Tsukuba 3' peach leaves was similar to that of David peach leaves, but its green-light absorbability was much stronger than that of David peach.

Key words: Anthocyanins; Chlorophyll b; Peach trees; Green light; UV-light