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荔枝*ACS1*基因的分离及其与幼果脱落的关系

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摘 要:【目的】植物中ACC合成酶(ACC synthase,ACS)和ACC氧化酶(ACC oxidase,ACO)是调控乙烯形成的关键酶。荔枝*ACO*基因已分离获得,在此基础上,笔者进一步从荔枝中分离出*ACS*基因,进而分析该基因与荔枝幼果脱落的关系。【方法】通过RT-PCR和RACE扩增技术相结合的方法分离荔枝*ACS*基因;利用遮阴、环剥摘叶和100 mg·L^{-1} NAA处理促进荔枝幼果脱落,进而用实时荧光定量PCR分析荔枝*ACS*基因与幼果脱落的关系。【结果】首次从荔枝中分离出*ACS*基因,命名为*Lc-ACS1*。Lc-ACS1推导的氨基酸序列与多种植物的ACS蛋白有较高的同源性,其中与甜橙和蓖麻的同源性最高,为76%。该基因包含*ACS*基因特有的11个不变氨基酸残基和7个保守区。遮阴、环剥摘叶和100 mg·L^{-1} NAA处理都可以显著促进荔枝幼果脱落,且环剥摘叶后幼果乙烯释放量高峰出现在第2天。*Lc-ACS1*基因在任何一种促进荔枝幼果脱落过程中的表达量都高于对照,且基因表达量的高峰都早于相对落果率高峰。【结论】*Lc-ACS1*基因可能是调控荔枝幼果脱落中的关键基因。

关键词:荔枝;ACC合成酶;基因克隆;基因表达;落果

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Isolation of *ACS1* gene and the relationship between its expression and fruitlet abscission in litchi

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Abstract:【Objective】ACC synthase (ACS) and ACC oxidase (ACO) are the key enzymes for ethylene synthesis in plants. One *ACO* gene from litchi (*Litchi chinensis* Sonn.) was isolated in our previous study. *ACS* gene was isolated and the relationship between the gene and fruitlet abscission was analysed in this research. 【Methods】Litchi trees were selected in the orchard of South China Agricultural University, Guangzhou, China (2009). Six 10-year-old 'Nuomici' trees were chosen for shading treatment at 30 d after anthesis (DAA). Three of them were treated by shading (shaded to 18% of full sun with a neutral density black-polypropylene shade cloth), and the other three were used for control, and each tree was a biological replicate. Ten fruit-bearing shoots located in different directions of each tree were tagged for calculating relative fruitlet abscission rate (RFAR) and collecting samples. Three 10-year-old 'Kulin' litchi trees were treated by girdling plus defoliation at 25 DAA, and each tree was a biological replicate. Twenty fruit-bearing shoots located in different directions of each tree were tagged for calculating RFAR and collecting samples. Ten of them were treated by girdling (removing bark by about 0.5 cm in width) plus defoliation (removing all leaves above the girdling site), and the other ten were used as control. Two 10-year-old 'Heiye' litchi trees were chosen for NAA treatment at 30 DAA. One was sprayed with 100 mg·L^{-1} NAA, and another one was used as control. Fifteen fruit-bearing shoots located in different directions of each tree were tagged for calculating RFAR and collecting samples, and each five fruit-bearing shoots

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