

核桃原生质体瞬时转化及油体蛋白功能初探

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摘要: 核桃 (*Juglans regia* L.) 作为一种重要经济树种, 特别因其高脂肪含量而备受瞩目。核桃油的高营养价值, 温和口感以及易于消化吸收的特性, 使其成为高级保健食用油的理想选择, 尤其适用于儿童的生长期、女性的妊娠期和产后康复期。然而, 作为多年生木本植物, 因其结果周期较长, 雄花发育会消耗树体大量的营养等生理特性, 极大的限制了核桃产业的发展。目前核桃中瞬时遗传转化以及蛋白亚细胞定位的研究体系并不成熟, 通过瞬时转化和稳定表达的技术可以实现短时间内将目标基因表达于受体细胞中, 为后续核桃中基因-蛋白质研究提供一种快捷有效的方法。油体是植物细胞中的关键细胞器, 负责储存脂肪和油脂。这一功能对于支持种子的能量和营养储备, 以促进幼苗的生长和发育至关重要, 对于油体的研究有助于优化核桃油的生产途径, 提高产量和质量。这项研究背景下, 我们进行了针对核桃瞬时转化体系和油体蛋白定位的研究: 结果表明: (1) 本研究建立了一个瞬时转化系统, 为核桃研究提供了新的工具。

(2) 我们筛选了一套核桃细胞器的标记蛋白, 验证了瞬时转化体系的可行性和准确性 (3) 通过生物信息学分析, 我们鉴定了油体蛋白 *Oleosins* 基因家族成员, 探究了它们的物理性质和进化关系, 并用瞬时转化体系确定了它们的亚细胞定位。

Transient Transformation of Walnut Protoplasts and Preliminary Investigation of Oil Body Protein Function

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Abstract: Walnut (*Juglans regia* L.), as a vital economic tree species, has gained significant attention, primarily due to its high fat content. The high nutritional value, mild taste, and easy digestibility of walnut oil make it an ideal choice for premium health-promoting edible oil, especially suitable for children during growth, women during pregnancy, and postpartum recovery. However, as a perennial woody plant, its long fruiting cycle, nutrient depletion during male flower development, and other physiological characteristics significantly hinder the development of the walnut industry. Fast breeding, improvement, and breeding are research hotspots in this context. Currently, the research system for transient genetic transformation and protein subcellular localization in walnuts is not well-established. Transient transformation and stable expression techniques can be used to achieve the rapid expression of target genes in recipient cells, providing a rapid and efficient approach for subsequent studies of walnut gene-protein relationships. Oil bodies are critical organelles in plant cells responsible for storing fats and oils. This function is crucial for supporting seed energy and nutrient reserves, promoting seedling growth and

development. Investigating oil bodies can optimize the production pathway of walnut oil, enhancing both yield and quality. In this context, we conducted research on the transient transformation system of walnuts and the subcellular localization of oil body proteins. The results showed that: (1) This study established a transient transformation system, providing a new tool for walnut research. (2) We screened a set of walnut organelle marker proteins, validating the feasibility and accuracy of the transient transformation system. (3) Through bioinformatics analysis, we identified the Oleosins gene family members, exploring their physical properties and evolutionary relationships, and confirmed their subcellular localization using the transient transformation system.