

专论与综述

植物淀粉合成的调控酶

康国章, 王永华, 郭天财, 朱云集, 官春云*

(河南农业大学国家小麦工程技术研究中心, 郑州 450002)

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摘要 淀粉是植物中最普通的碳水化合物, 是人类最主要的食品来源与重要的工业原料。植物淀粉的生物合成主要涉及了4种酶—ADPG焦磷酸化酶、淀粉合成酶、淀粉分支酶和淀粉去分支酶, 它们在淀粉的生物合成中发挥着不同作用。近年来, 随着基因工程技术的迅速发展及与这些酶有关的众多突变体的发现, 人们对这些酶的结构、特性、功能及表达调控等方面的研究取得了重要进展。并且, 人们已开始利用基因工程技术调控植物淀粉的数量与特性, 取得了一定成效。在此, 文章介绍了调控植物淀粉合成关键酶的生化特性、基因调控及利用基因工程改良植物淀粉等方面所取得进展。

关键词 [淀粉](#); [突变体](#); [生物合成](#); [基因工程](#)

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Key Enzymes in Starch Synthesis in Plants

KANG Guo-Zhang, WANG Yong-Hua, GUO Tian-Cai, ZHU Yun-Ji, GUAN CHun-Yun

(National Engineering Research Centre for Wheat, Henan Agricultural University, Zhengzhou 450002, China)

Abstract

Starch, the most common form of stored carbon in plants, is both the major food source for mankind and important raw material for many industries. It is composed of two types of α -1,4-linked glucan polymer: essentially unbranched amylose and regularly branched amylopectin, and synthesized in photosynthetic and non-photosynthetic organs. Starch is synthesized via four committed enzyme steps: ADP-Glc pyrophosphorylase, which synthesizes sugar nucleotide precursors; starch synthase, which extends the α -1,4-linked glucan chains using ADP-Glc; starch-branching enzymes, which introduce α -1,6 branch points to form amylopectin; and starch debranching enzymes, which hydrolyze α -1,6 branches in glucans. In this paper, recent advances in biochemical characterizations and gene engineering concerning these enzymes were reviewed, and the achievements in gene engineering involved in manipulation of starch amount and quality were also cited.

Key words [starch](#) [mutants](#) [biosynthesis](#) [gene engineering](#)

DOI:

通讯作者 康国章 kanguozhang@eyou.com

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