

Advances in food and nutrition research [basic science to biotechnology /

Noemi Sivak, Mirta Preiss, Jack (1932-) Academic Press, c1998 Electronic books

Monografía

This volume presents the physiological and biochemical aspects of storage carbohydrates, or starch granules, in plants. This up-to-date and thorough resource carefully integrates fundamental knowledge with the most recent information on the starch granule. It discusses the chemistry of the starch granule and the biochemistry, molecular biology, plant physiology, and genetics of plant starch synthesis. The books also describes the implications of these studies for theseed, biotechnology, and modified starch industries.Key Features* Written for a broad readership* Emphasizes the

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Título: Advances in food and nutrition research electronic resource]. Volume 41 Starch basic science to biotechnology edited by Mirta Noemi Sivak and Jack Preiss

Editorial: San Diego Academic Press c1998

Descripción física: 1 online resource (217 p.)

Mención de serie: Advances in food and nutrition research v. 41

Nota general: Description based upon print version of record

Bibliografía: Includes bibliographical references and index

Contenido: Front Cover; Advances in Food and Nutrition Research; Copyright Page; Contens; Preface; Chapter 1. Occurrence of Starch; I. Introduction; II. Seeds; III. Storage Roots and Tubers; IV. Starch in the Gravitational Response of Roots and Stems; V. Leaves; VI. Green Algae; VII. Other Reserve Polysaccharides; VIII. Experimental Systems in the Study of Starch Metabolism; Further Readings; Chapter 2. Physicochemical Structure of the Starch Granule; I. The Starch Granule; II. Amylose and Amylopectin; III. Molecular Orientation in the Granule; IV. Methodology and Nomenclature Used in Starch Analysis V. Other Constituents of the Starch GranuleVI. Lipids; VII. Phosphorus; VIII. Proteins; Further Readings; Chapter 3. Biosynthetic Reactions of Starch Synthesis; I. Introduction; II. Pioneering Studies; III. The ADPglucose Pathway Is the Major Pathway of Starch Synthesis in Vivo; IV. Alternative Pathways; V. Rate of Starch Synthesis versus Activities of the Starch Biosynthetic Enzymes; VI. A Missing Step?; VII. Summary; Chapter 4. Synthesis of the Glucosyl Donor: ADPglucose Pyrophosphorylase; I. Regulatory Properties; II. Physiologic Relevance of the ADPGlc PPase Regulatory Properties III. Subunit StructureIV. Structure-Function Relationships; V. Function of the Higher Plant ADPGlc PPase Subunits; VI. Identification of the Substrate Binding Sites; VII. Cloning of the ADPGlc PPase Gems and Comparison of Their Sequences; VIII. Hydrophobic Cluster Analysis; IX. Transcription; X. Genomic DNA; Chapter 5. Starch Synthases; I. Introduction; II. Soluble Starch Synthases; III. Starch Synthases Bound to the Starch Granule; IV. Isolation of the Waxy Protein Structural Gene; V. Studies of Ch!amydomonas reinhardtii Mutants; Further Readings; Chapter 6. Branching Enzymes I. IntroductionII. Assay; III. Purification of Branching Enzyme Multiforms; IV. Mode of Action; V. How Many Genes for Three Maize-Branching Enzymes?; VI. Other Species; VII. Relationship between Structure and Function; Chapter 7. Open Questions and Hypotheses in Starch Biosynthesis; I. Initiation of Starch Biosynthesis; II. How Is the Starch Granule Formed?; III. A Complete Pathway; Chapter 8. The Site of Starch Synthesis in Nonphotosynthetic Plant Tissues: The Amyloplast; I. Microscopy and Immunocytochemical Studies; II. Cell Fractionation; Ill. Transport of Carbon into Amyloplasts Chapter 9. Regulation of the Starch Synthesis Pathway: Targets for BiotechnologyI. Introduction; II. Genetic Engineering; III. Vectors; IV. Protoplast Isolation and Transformation; V. Plant Regeneration; VI. Tissue- and Organelle-Specific Expression; VII. Antisense Technology; VIII. Other Uses of Gene Technology; IX. Transformation of Plants with an Escherichia coli Allosteric Mutant glg C Gene Increases Starch Content; X. Are Other Starch Biosynthetic Enzymes Rate Limiting?; XI. Other Physiologic Effects of Manipulation of Starch Synthesis; XII. Conclusions; Further Readings Chapter 10. Starch Accumulation in Photosynthetic Cells

Lengua: English

ISBN: 1-281-72475-0 9786611724757 0-08-056786-X

Materia: Starch- Synthesis Plant products- Synthesis Plant biotechnology industry Starch- Structure

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Enlace a serie principal: Advances in food and nutrition research (CKB)954927715364 (DLC)2011233087 (OCoLC)60644000 2213-6797

Enlace a formato físico adicional: 0-12-016441-8

Punto acceso adicional serie-Título: Advances in Food and Nutrition Research

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