

1. Record Nr.	UNINA9910484379103321
Titolo	Carotenoids : biosynthetic and biofunctional approaches / / Norihiko Misawa, editor
Pubbl/distr/stampa	Singapore : , : Springer, , [2021] ©2021
ISBN	981-15-7360-3
Descrizione fisica	1 online resource (xi, 293 pages) : illustrations
Collana	Advances in experimental medicine and biology ; ; Volume 1261
Disciplina	612.01528
Soggetti	Carotenoids
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Preface and Introduction -- Contents -- Part I: Biosynthetic Approach -- 1: Commercial Production of Astaxanthin from the Green Alga <i>Haematococcus pluvialis</i> -- 1.1 Introduction -- 1.2 Functions and Uses of Natural Astaxanthin -- 1.3 Natural Sources for Astaxanthin -- 1.4 Life History of <i>H. pluvialis</i> -- 1.5 Mass Culture of <i>H. pluvialis</i> -- 1.6 Extraction of Astaxanthin -- 1.7 Future of <i>H. pluvialis</i> -Derived Astaxanthin -- References -- 2: Commercial Production of Astaxanthin with <i>Paracoccus carotinifaciens</i> -- 2.1 Introduction -- 2.2 <i>P. carotinifaciens</i> -- 2.3 Improvement of Producing Astaxanthin with <i>P. carotinifaciens</i> -- 2.4 Commercial Production of Astaxanthin with <i>P. carotinifaciens</i> -- 2.5 Usage Examples of Dehydrated <i>P. carotinifaciens</i> -- 2.6 Astaxanthin-Rich Carotenoid Extracts (ARE) Derived from <i>P. carotinifaciens</i> -- References -- 3: Production of Carotenoids from Cultivated Seaweed -- 3.1 Introduction -- 3.2 Cultivation of <i>C. okamuranus</i> Discoid Germlings in Floating Form -- 3.3 Production of Fucoxanthin and Fucoxanthin Chlorophyll a/c Protein -- 3.4 Cultivation of Various Brown Algae in Microalgal Forms -- 3.5 Cultivation of <i>Codium intricatum</i> Trichomes in Floating Form -- 3.6 Prospects for the Future -- References -- 4: Carotenoid Metabolism in Aquatic Animals -- 4.1 Introduction -- 4.2 Carotenoids in Porifera -- 4.3 Carotenoids in Coelenterata -- 4.4 Carotenoid Metabolism in Mollusca (Mollusks) and Protochordata (Tunicates) -- 4.4.1 Metabolism of Fucoxanthin in Bivalves and Tunicates -- 4.4.2 Metabolism of Peridinin in Bivalves and

Tunicates -- 4.4.3 Metabolism of Diatoxanthin and Alloxanthin in Bivalves and Tunicates -- 4.4.4 Oxidation of Carotenoids in Snail -- 4.4.5 Reduction of Carotenoids with 4-Oxo--End Group to 4-Hydroxy-5,6-Dihydro--End Group in Spindle Shells. 4.4.6 Oxidative Cleavage of Carbon-Carbon Double Bond at C7'-C8' in C40 Skeletal Carotenoids to Form 8'-Apocarotenoids -- 4.4.7 Novel Carotenoid Pyropheophorbide a Esters from Abalone -- 4.5 Carotenoid Metabolism in Arthropoda (Crustaceans) -- 4.5.1 Oxidation of -Carotene to Astaxanthin in Crustaceans -- 4.5.2 Racemization of Astaxanthin and Reductive Metabolic Pathways of Carotenoids in Prawn -- 4.5.3 Other Oxidative Metabolic Pathways of Carotenoids in Crustaceans -- 4.6 Carotenoid Metabolism in Echinodermata (Echinoderms) -- 4.7 Metabolism of Carotenoids in Fish -- 4.7.1 Epimerization of Lutein Through 3-Hydroxy-, -Caroten-3'-One and Oxidative Metabolisms of Lutein and Zeaxanthin in Cypri... -- 4.7.2 Reductive Metabolism Pathway of Astaxanthin in Perciformes and Salmonidae Fish -- 4.7.3 Hydrogenation of Double Bond at C7-C8 (C7'-C8') in Catfish *Silurus asotus* -- 4.7.4 Oxidation of Hydroxy Groups and Retro Rearrangement of Polyene Chain of Zeaxanthin in Tilapia *Tilapia nilotica* -- 4.7.5 Other Unique Structures of Carotenoids in Fish -- 4.7.6 Formation of Apocarotenoids in Fish -- 4.7.7 Conversion of Carotenoids to Retinoids in Fish -- 4.8 Examples of Food Chains and Metabolic Conversion of Carotenoids in Marine Animals -- 4.9 Metabolic Conversion and Increasing Anti-oxidative Activity of Carotenoids in Aquatic Animals -- References -- 5: Carotenoid Metabolism in Terrestrial Animals -- 5.1 Introduction -- 5.2 Mollusca (Snail) -- 5.3 Arthropoda -- 5.3.1 Insecta -- 5.3.1.1 Hemiptera (Aphid, Whitefly, Stink Bug, and Planthopper) -- 5.3.1.2 Coleoptera (Beetle) -- 5.3.1.3 Odonata (Dragonfly and Damselfly) -- 5.3.1.4 Orthoptera (Locust and Mantis) -- 5.3.1.5 Phasmatodea (Stick Insect) -- 5.3.1.6 Ephemeroptera (Mayfly) -- 5.3.1.7 Diptera (Fly) -- 5.3.1.8 Trichoptera (Caddisfly) -- 5.3.1.9 Lepidoptera (Butterfly and Moth). 5.3.2 Arachnida (Spider and Spider Mite) -- 5.4 Amphibia (Frog) -- 5.5 Reptilia (Snake and Lizard) -- 5.6 Aves (Bird) -- 5.6.1 Carotenoid Metabolism in Chicken -- 5.6.2 Carotenoids in Zebra Finch -- 5.6.3 Carotenoids in Plumage (Feathers) of Birds -- 5.6.4 Novel Methoxy Carotenoids in Feathers of Cotinga -- 5.6.5 Identification of Carotenoid 4-Ketolase Gene in Zebra Finch -- 5.7 Mammals -- References -- 6: Metabolism of Carotenoids in Mammals -- 6.1 Introduction -- 6.2 Oxidative Metabolites of Carotenoid in Vertebrates -- 6.3 Oxidative Metabolism of Fucoxanthin in Mice -- 6.4 Oxidative Metabolism of Lutein in Mice -- 6.5 Lutein Oxidation and Its Accumulation in Tissues -- 6.6 Biological Activity of Keto-Carotenoids -- 6.7 Cleavage of Carotenoids -- 6.8 Bioavailability of Carotenoids and Cleavage Enzymes -- 6.9 Conclusions -- References -- 7: Diversity and Evolution of Carotenoid Biosynthesis from Prokaryotes to Plants -- 7.1 Carotenoid Pathways in Different Groups of Organisms -- 7.1.1 Archaea -- 7.1.2 Bacteria -- 7.1.3 Algae and Plants -- 7.1.3.1 Primary Plastid Groups -- 7.1.3.2 Algae from Secondary Endosymbiosis -- 7.1.3.3 Plants -- 7.1.4 Fungi and Animals -- 7.2 Evolutionary Relatedness and Diversity of Carotenogenic Genes -- 7.2.1 The Universal Phytoene Synthase -- 7.2.2 Phytoene Desaturation Diversity -- 7.2.2.1 The CrtI-Type from Prokaryotes and Fungi -- 7.2.2.2 The crtP/Pds-Type Desaturases -- 7.2.2.3 Other Carotenogenic Genes Related to crtI -- 7.2.3 Multiple Lycopene Cyclases -- 7.2.3.1 The Archaeal Type CrtYcd -- 7.2.3.2 CruA/CruP Cyclases in Photosynthetic Prokaryotes -- 7.2.3.3 CrtY and CrtL from Bacteria -- 7.2.4 - and beta-Carotene 3-Hydroxylases -- 7.3 Evolution of Carotenoid

Biosynthesis from Bacteria to Plants -- References -- 8: Engineered Maize Hybrids with Diverse Carotenoid Profiles and Potential Applications in Animal Feeding.

8.1 Introduction -- 8.2 Combinatorial Nuclear Transformation Generates a Diverse Library of Plants with Distinct and Stable Phenotypes -- 8.3 Reconstruction of the Carotenoid Pathway in White Maize Leads to the Accumulation of Extraordinary Levels of Metabolic Int... -- 8.4 Reconstruction of the Astaxanthin Biosynthesis Pathway in Maize Endosperm Reveals a Metabolic Bottleneck in the Conversion... -- 8.5 Synergistic Metabolism in Hybrid Corn Indicates Bottlenecks in the Carotenoid Pathway and Leads to the Accumulation of Ext... -- 8.6 Combined Transcript, Proteome, and Metabolite Analysis of Transgenic Maize Seeds Engineered for Enhanced Carotenoid Synthe... -- 8.7 Metabolic Engineering of Ketocarotenoid Biosynthesis in Maize Endosperm and Characterization of a Prototype High Oil Astax... -- 8.8 Carotenoid-Enriched Transgenic Corn Delivers Bioavailable Carotenoids to Poultry and Protects Them Against Coccidiosis -- 8.9 High-Carotenoid Corn in Egg Production -- 8.10 Mice Fed on a Diet Enriched with Genetically Engineered High-Carotenoid Corn Show No Sub-acute Toxic Effects and No Sub-c... -- 8.11 Engineered Maize as a Source of Astaxanthin: Processing and Application as Fish Feed -- References -- 9: Carotenoid Biosynthesis in Liverworts -- 9.1 Introduction -- 9.2 Carotenoid Profile of Liverworts -- 9.3 Carotenoid Biosynthesis Genes of the Liverwort -- 9.4 The Evolutionary History of the Carotenoid Biosynthesis Genes -- 9.5 Concluding Remarks -- References -- 10: Metabolic Engineering for Carotenoid Production Using Eukaryotic Microalgae and Prokaryotic Cyanobacteria -- 10.1 Introduction -- 10.2 Technologies for Metabolic Engineering of Microalgae and Cyanobacteria -- 10.3 Carotenoid Synthesis Pathways in Microalgae and Cyanobacteria -- 10.4 Recent Achievements Through Metabolic Engineering -- 10.4.1 Enzymes in the MEP Pathway. 10.4.2 Phytoene Synthase -- 10.4.3 Phytoene Desaturase -- 10.4.4 beta-Carotene Hydroxylase and Zeaxanthin Epoxidase -- 10.4.5 beta-Carotene Ketolase -- 10.5 Conclusions -- References -- 11: *Xanthophyllomyces dendrorhous*, a Versatile Platform for the Production of Carotenoids and Other Acetyl-CoA-Derived Compoun... -- 11.1 Introduction -- 11.2 Astaxanthin Biosynthesis and Acetyl-CoA Metabolism in *Xanthophyllomyces dendrorhous* -- 11.3 Potential of *X. dendrorhous* as a Cell Factory for the Production of Terpenoids and Poly-unsaturated Fatty Acids -- 11.4 Tools and Techniques for Genetic Manipulations of *X. dendrorhous* -- 11.5 Treatment to Achieve Genetic Stability of the Diploid *X. dendrorhous* Transformants -- 11.6 Engineering of Enhanced Astaxanthin Biosynthesis -- 11.7 Accumulation of Phytoene by Pathway Disruption -- 11.8 Pathway Extension from -Carotene to Zeaxanthin. -- 11.9 Versatility of *X. dendrorhous* for Combinatorial Biosynthesis of Novel Carotenoid Structures -- 11.10 Genetic Extension of the Fatty Acid Pathway to the Formation of Arachidonic Acid -- 11.11 Perspectives -- References -- 12: Carotenoid Production in Oleaginous Yeasts -- 12.1 Introduction -- 12.2 Carotenoid-Producing Oleaginous Yeasts (Red Yeasts) -- 12.3 Genetically Modified Oleaginous Yeasts -- 12.4 Carotenoid Production by Genetically Modified *Xanthophyllomyces dendrorhous* -- 12.5 Carotenoid Production by Genetically Engineered Oleaginous Yeast *Yarrowia lipolytica* -- 12.6 Carotenoid Production by Genetically Engineered Oleaginous Yeast *Lipomyces starkeyi* -- 12.7 For Efficient Carotenoid Production by Oleaginous Yeasts -- References -- 13: Haloarchaea: A Promising Biosource for Carotenoid Production -- 13.1 Haloarchaea -- 13.2 Haloarchaea-Based Biotechnology -- 13.3

Carotenoids from Haloarchaea -- 13.3.1 Biological Roles -- 13.3.2
Production -- 13.4 Conclusions -- References.
14: Carotenoid Biosynthesis in the Phylum Actinobacteria.
