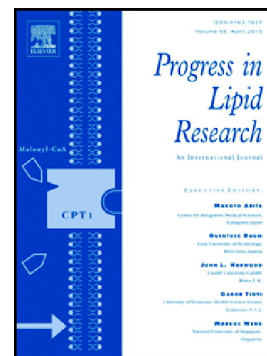


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A global perspective on carotenoids: Metabolism, biotechnology, and benefits for nutrition and health

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A global perspective on carotenoids: metabolism, biotechnology, and benefits for nutrition and health.

Manuel RODRIGUEZ CONCEPCION^{a,*} manuel.rodriguez@cragenomica.es, Javier AVALOS^b, M. Luisa BONET^c, Albert BORONAT^{a,d}, Lourdes GOMEZ-GOMEZ^e, Damaso HORNERO-MENDEZ^f, M. Carmen LIMON^b, Antonio J. MELÉNDEZ-MARTÍNEZ^g, Begoña OLMEDILLA-ALONSO^h, Andreu PALOU^c, Joan RIBOT^c, Maria J. RODRIGOⁱ, Lorenzo ZACARIAS^l, Changfu ZHU^j

^aCentre for Research in Agricultural Genomics (CRAG) CSIC-IRTA-UAB-UB, 08193 Barcelona, Spain.

^bDepartment of Genetics, Universidad de Sevilla, 41012 Seville, Spain.

^cLaboratory of Molecular Biology, Nutrition and Biotechnology, Universitat de les Illes Balears; CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn); and Institut d'Investigació Sanitària Illes Balears (IdISBa), 07120 Palma de Mallorca, Spain.

^dDepartment of Biochemistry and Molecular Biomedicine, Universitat de Barcelona, 08028 Barcelona, Spain

^eInstituto Botánico, Universidad de Castilla-La Mancha, 02071 Albacete, Spain.

^fDepartment of Food Phytochemistry, Instituto de la Grasa (IG-CSIC), 41013 Seville, Spain.

^gFood Color & Quality Laboratory, Area of Nutrition & Food Science, Universidad de Sevilla, 41012 Seville, Spain.

^hInstitute of Food Science, Technology and Nutrition (ICTAN-CSIC), 28040 Madrid, Spain.

ⁱInstitute of Agrochemistry and Food Technology (IATA-CSIC), 46980 Valencia, Spain.

^jDepartment of Plant Production and Forestry Science, Universitat de Lleida-Agrotecnic, 25198 Lleida, Spain

* Corresponding author.

Abstract

Carotenoids are lipophilic isoprenoid compounds synthesized by all photosynthetic organisms and some non-photosynthetic bacteria and fungi. With some notable exceptions, animals (including humans) do not produce carotenoids *de novo* but take them in their diets. In photosynthetic systems carotenoids are essential for photoprotection against excess light and contribute to light harvesting, but perhaps they are best known for their properties as natural pigments in the yellow to red range. Carotenoids can be associated to fatty acids, sugars, proteins, or other compounds that can change their physical and chemical properties and influence their biological roles. Furthermore, oxidative cleavage of carotenoids produces smaller molecules such as apocarotenoids, some of which are important pigments and volatile (aroma) compounds. Enzymatic breakage of carotenoids can also produce biologically active molecules in both plants (hormones, retrograde signals) and animals (retinoids). Both carotenoids and their enzymatic cleavage products are associated with other processes positively impacting human health. Carotenoids are widely used in the industry as food ingredients, feed additives, and supplements. This review, contributed by scientists of complementary disciplines related to carotenoid research, covers recent advances and provides a perspective on future directions on the subjects of carotenoid metabolism, biotechnology, and nutritional and health benefits.

Keywords

Biotechnology, carotenoid, health, metabolism, nutrition, pigment

Introduction

Carotenoids are isoprenoid metabolites synthesized by all photosynthetic organisms (including plants, algae and cyanobacteria) and some non-photosynthetic archaea, bacteria, fungi and animals. In photosynthetic systems, carotenoids participate in light harvesting and they are

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