

Britton, G., Liaaen-Jensen, S., Pfander, H. (ed.): **Carotenoids. Handbook.** – Birkhäuser Verlag, Basel – Boston – Berlin 2004. ISBN 3-7643-6180-8. € 108.00, CHF 168.00.

This book does not belong to the series “Carotenoids” edited by the same three well-known specialists in this field and published under a similar orange-blue cover by the same publishing house. As an independent manual it continues in the tradition started by the monograph of P. Karrer and E. Jucker (1948) in which structures of about 30 natural carotenoids were described. The tradition continued by the book “Carotenoids” edited by O. Isler (1971) and by the “Key to Carotenoids” published in two editions and edited by O. Straub and later by H. Pfander. The amount of known natural carotenoids presented in these books has continuously increased.

Up till now about 750 carotenoids have been described in biological materials. They are synthesised by plants, algae, fungi, and bacteria, and occur also in animals that feed on them. In animals carotenoids may be metabolically modified. All these carotenoids are items of the reviewed handbook, and in addition to them also carotenoids produced by genetically modified plants and microbes. The editors prepared this overview for about seven years. A.Z. Mercadente and E.S. Egeland helped them with data collection and material compilation; four additional co-workers made the technical work.

Section I of the handbook (*ca.* 30 pages) deals with its philosophy and aims, strategy and criteria for selection, and explains how individual paragraphs of carotenoid lists were prepared and how they can be used.

Lists of naturally occurring carotenoids form section II. It has two parts. In the “Main List” only those carotenoids are described which satisfy the criteria for acceptable identification. Full page is dedicated here to every such carotenoid, and individual paragraphs of the page are orange tinged. Common name and used number, IUPAC name, molecular formula ($C_xH_yO_z$), and molecular structure characterise the carotenoid. As concerns spectroscopic data, typical absorption curve in petroleum or ethanol is presented together with specific details of different kinds of spectra. Main values of UV/Vis absorption spectrum (wavelengths of peaks in most often used solvents, solvent effects such as bathochromic shift, spectral fine structure characteristics such as ratio of the second and third peak, *i.e.* %III/II, specific absorption coefficients $A^{1\%}$) are given. Further values specify mass

spectrum, circular dichroism spectrum, and NMR spectrum. Additional information consists of three parts: synthesis, source and method of isolation, remarks, and main (up to seven) references. The reader is also informed in which volumes of the series “Carotenoids” he can find more details. (Two parts of first volume of the series deal with isolation and analysis, and spectroscopy, vol. 2 is devoted to chemical synthesis, and vol. 3 to biosynthesis and metabolism in living organisms. Vol. 4 on biological functions and carotenoids in health is in preparation.)

The “Supplementary List” gives basic facts on carotenoids that were not sufficiently characterised. In this case every page informs of three carotenoids, figures of spectra are not given, and orange tinge is missing. Some of pigments in this list are derivatives or may be artefacts or degradation products. Finally, orientation in the book is made easy by the detailed index of carotenoid names that includes common, alternative, and IUPAC names.

Let us have a look on one of the items. Vaucherixanthin, $C_{40}H_{56}O_5$, bears the number 238, and its IUPAC name is (3*S*,5*R*,6*R*,3'*S*,5'*R*,6'*S*)-5',6'-epoxy-6,7-didehydro-5,6,5',6'-tetrahydro- β,β -carotene-3,5,3',19'-tetrol. Its UV-Vis data are given for ethanol, acetone, and chloroform, CD values for ethanol, and reference is given for complete assignment of NMR and MS spectral characteristics. Synthesis has not been reported, the pigment was isolated in free and esterified form from *Nannochloropsis salina*. It was purified by TLC or HPLC (reference to the thesis of S. Egeland is supplemented, as well as other three references; the oldest one by H. Stransky and A. Hager from 1970 contains infrared data). The natural esters of vaucherixanthin are included in the Supplementary List as items 238.1 and 238.2.

This shortened information shows that the reader finds here all necessary values for analysis, and basic references. The book is certainly of great value to biologists and biochemists especially now, when detailed study of carotenoids is stimulated by interesting biotechnological and medicinal findings. It is probably not necessary to underline its importance as a reference manual for researchers working in various fields of photosynthesis.

Z. ŠESTÁK (Praha)