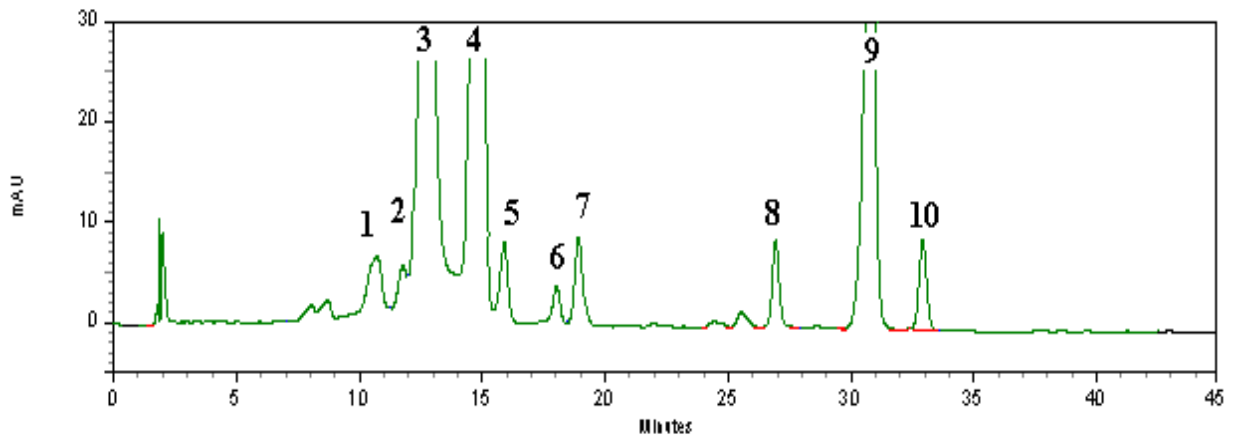


附錄一、溶劑的極性指標及沸點

Appendix 1. The polarity index and boiling point of solvents.

SOLVENT	POLARITY INDEX	BOILING POINT
Acetone	5.1	56
Chloroform	4.1	61
Ethyl Acetate	4.4	77
Ethanol	5.2	78
di-Ethyl Ether	2.8	35
Hexane	0.0	69
Methanol	5.1	65
Methyl-t-Butyl Ether	2.5	55
iso-Propanol	3.9	82
Tetrahydrofuran	4.0	65
Water	9.0	100

(Phenomenex, 1999)



(Chiu, 2008)

附錄二、在梯度沖提系統下葉黃素、玉米黃素、 β -胡蘿蔔素及其順式異構物之 HPLC 層析圖 (偵測波長：450 nm)

Appendix 2. HPLC chromatogram of lutein, zeaxanthin, β -carotene and their stereoisomers under a gradient elution system (detection wavelength : 450 nm). Peaks: (1) 13-cis lutein, (2) 13'-cis lutein, (3) all-trans-lutein, (4) all-trans zeaxanthin, (5) 9-cis lutein, (6) 9'-cis lutein, (7) 9-cis zeaxanthin, (8) 13-cis β -carotene, (9) all-trans β -carotene, (10) 9-cis β -carotene.

附錄三、附錄二中全反式葉黃素、玉米黃素及β-胡蘿蔔素及其所有順式異構物波峰之光譜初步鑑定結果

Appendix 3. Tentative identification and chromatographic data for all-trans and cis forms of lutein、zeaxanthin and β-carotene standard in Appendix 2

Peak no.	Carotenoid	Retention time (min)	λ (nm)(in-line) ¹				λ(nm)(reported)			
			(λ _{max}) ²				(λ _{max})			
1	13-cis-lutein	10.748	330	417	(438)	465	330	–	(439)	466 ⁴
2	13'-cis-lutein	11.785	330	418	(438)	465	330	–	(439)	466 ⁴
3	all-trans-lutein	12.816	– ³	420	(444)	471	331	–	(444)	473 ⁴
4	all-trans-zeaxanthin	14.896	–	420	(450)	476	–	–	(450)	478 ⁴
5	9-cis-lutein	15.909	329	418	(439)	467	330	–	(440)	467 ⁴
6	9'-cis-lutein	18.040	329	420	(440)	468	330	–	(440)	468 ⁴
7	9-cis-zeaxanthin	18.932	339	418	(445)	471	338	–	(445)	472 ⁴
8	13-cis-β-Carotene	26.955	337	420	(444)	469	–	419	(447)	471 ⁵
9	all-trans-β-Carotene	30.836	–	–	(451)	477	–	429	(453)	477 ⁵
10	9-cis-β-Carotene	32.936	340	420	(446)	471	–	418	(447)	471 ⁵

¹A gradient mobile phase of MeOH: MTBE: H₂O = 81: 15: 4 and MeOH: MTBE = 6: 90 was used.

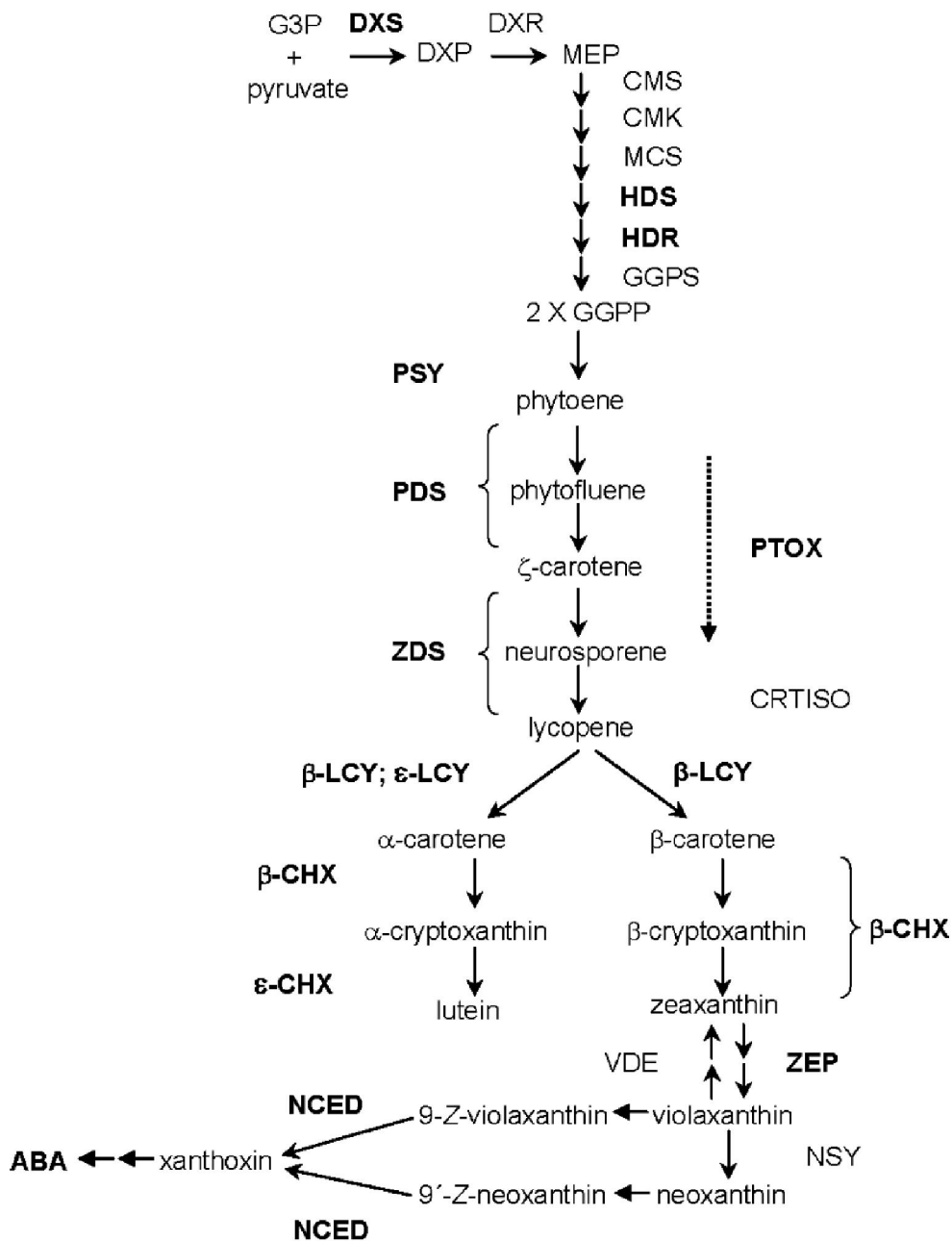
²Values in parentheses represent the main absorption maxima.

³ “ – ” Data not available

⁴An isocratic mobile phase of MeOH (2% ammonium acetate, pH 4.6): MTBE = 85: 15 was used by Updike and Schwatz (2003).

⁵A gradient mobile phase of methanol (100%) and methylene chloride (100%) was used by Rajendran and Chen (2007).

(Chiu, 2008)



(Alquzar, B., et al., 2008)

附錄四、植物中類胡蘿蔔素合成途徑

Appendix 4. Schematic diagram of the carotenoid biosynthesis pathway in plants. geranylgeranyl diphosphate; PSY, phytoene synthase; PDS, phytoene desaturase; ZDS, f-carotene desaturase; PTOX, plastid terminal oxidase; CRTISO, carotene isomerase; e-LCY, lycopene e-cyclase; b-LCY, lycopeneb-cyclase; b-CHX, b-carotene hydroxylase; e-CHX, e-carotene hydroxylase; ZEP, zeaxanthin epoxidase; VDE, violaxanthin de-epoxidase; NSY, neoxanthin synthase; NCED, nine-cis-epoxycarotenoid dioxygenase; ABA, abscisic acid