

## SYMPOSIUM PROGRAMME

### Sunday 22<sup>nd</sup> June

14:00 REGISTRATION DESK OPENS

18:30-20:30 WELCOME RECEPTION

### Monday 23<sup>rd</sup> June

09:00-09:30 OPENING OF THE SYMPOSIUM (Mermaid Hall & Hall 3)

#### Plenary Lectures of Session 3 & 5 (Mermaid Hall & Hall 3)

09:30-10:10 **Masayoshi Ito** (Japan)  
CAROTENOID SYNTHESIS: RETROSPECT AND RECENT PROGRESS

10:10-10:40 BREAK

10:40-11:20 **Frederick Khachik** (USA)  
SYSTEMATIC APPROACH IN ISOLATION AND CHARACTERIZATION OF  
CAROTENOIDS IN FOODS, HUMAN PLASMA AND TISSUES

11:20-12:00 ICS Award Ceremony (Mermaid Hall)

12:00-13:00 Luncheon Seminar-1 Sponsored by Cognis Nutrition & Health (Mermaid Hall)

13:00-15:00 Poster Viewing & Resort Time

#### Session 1. Astaxanthin Symposium (Mermaid Hall & Hall 3)

15:00-15:40 Plenary Lecture: **Wataru Miki** (Japan)  
ASTAXANTHIN IS MY LOVE!  
- CONNECTION WITH THE PINK CAROTENOID OVER THIRTY YEARS -

15:40-16:05 Invited Lecture: **Shigeaki Ohno** (Japan)  
EFFECTS OF ASTAXANTHIN ON EYE FATIGUE

16:05-16:30 Invited Lecture: **Masaharu Ishikura** (Japan)  
HEALTH BENEFITS OF ASTAXANTHIN-PERSPECTIVE OF IMPROVING  
METABOLIC SYNDROME AND COGNITIVE IMPAIRMENT

16:30-16:50 **Marcelo P. Barros** (Brazil)  
MEMBRANE CHARGE AND pH MODULATE ANTIOXIDANT ACTIVITY OF  
ASTAXANTHIN AGAINST OXIDATION PROMOTED BY THE APOPTOSIS  
MIMICKING SYSTEM PEROXYNITRITE/CYTOCHROME c

- 16:50-17:10 BREAK
- 17:10-17:35 Invited Lecture: **Teruo Miyazawa** (Japan)  
IMPOTENCE OF ANTIOXIDANT XANTHOPHYLLS IN RED BLOOD CELLS OF PATIENT WITH SENILE DEMENTIA
- 17:35-18:00 Invited Lecture: **Eiji Yamashita** (Japan)  
ANTI-PHOTOAGING BY ASTAXANTHIN FOR SKIN
- 18:00-18:20 **Makoto Inoue** (Japan)  
ASTAXANTHIN IS A NOVEL SELECTIVE PEROXISOME PROLIFERATOR-ACTIVATED RECEPTOR  $\gamma$  MODULATOR
- 18:20-18:40 **Yuji Naito** (Japan)  
ASTAXANTHIN PROTECTS MESANGIAL CELLS FROM HYPERGLYCEMIA-INDUCED OXIDATIVE SIGNALING
- 18:40-19:00 **Mayumi Ikeuchi** (JAPAN)  
BENEFICIAL EFFECTS OF ASTAXANTHIN IN OBESE MICE FED A HIGH-FAT DIET

## Tuesday 24<sup>th</sup> June

- 08:00-09:00 Morning Seminar-1 Sponsored by Kemin Health, L.C. and DSM Nutritional Products, Ltd. (Mermaid Hall)

### PARALLEL SESSIONS 2 & 3

#### Session 2. Carotenoids and Sports Nutrition (Hall 3)

- 09:00-09:40 Plenary Lecture: **Stefan Branth** (Sweden)  
EXERCISE GENERATED FREE RADICALS AND ANTIOXIDANT PROTECTION WITH SPECIAL EMPHASIS ON CAROTENOIDS
- 09:40-10:05 Invited Lecture: **Natsue Koikawa** (Japan)  
THE SUPPLEMENTATION EFFECTS OF ASTAXANTHIN ON SPORTS PERFORMANCE IN ATHLETES
- 10:05-10:25 **Wataru Aoi** (Japan)  
ASTAXANTHIN IMPROVES MUSCLE LIPID METABOLISM IN EXERCISE
- 10:25-10:50 BREAK
- 10:50-11:15 Invited Lecture: **Kazuhisa Kawamoto** (Japan)  
CONTRIBUTION OF ENERGY SYSTEM IN 400m DASH AND USE OF ASTAXANTHIN IN TRAINING
- 11:15-11:40 Invited Lecture: **Kazunaga Yazawa** (Japan)  
ASTAXANTHIN AND EXERCISE - A NEW STRATEGY FOR WEIGHT

## MANAGEMENT

11:40-12:00 **Mayumi Ikeuchi** (Japan)  
EFFECTS OF ASTAXANTHIN AND EXERCISE ON MITOCHONDRIAL  
ENZYMES IN MICE

### **Session 3. Organic and Natural Products Chemistry of Carotenoids including Chemical Synthesis** (Mermaid Hall)

09:00-09:25 Invited Lecture: **Helmut Sies** (Germany)  
PHOTOPROTECTION BY LYCOPENE: FROM SINGLET OXYGEN QUENCHING  
TO NUTRITIONAL SKIN PROTECTION

09:25-09:50 Invited Lecture: **Péter Molnár** (Hungary)  
RESEARCH OF THE (*E/Z*)-ISOMERIZATION OF CAROTENOIDS IN PÉCS  
SINCE THE BEGINNING OF 1970S

09:50-10:10 **Geir Kildahl-Andersen** (Norway)  
BLUE CAROTENOIDS

10:10-10:35 BREAK

10:35-11:00 Invited Lecture: **Takashi Maoka** (Japan)  
RECENT PROGRESS IN STRUCTURAL SYUDIES OF CAROTENOIDS IN  
ANIMALS AND PLANTS

11:00-11:25 Invited Lecture: **Shigeo Katsumura** (Japan)  
WHY DOES PERIDININ POSSESS THE ALLENE FUNCTION?  
APPROACH FROM THE ORGANIC SYNTHESIS

11:25-11:45 **Eugenia Mariana Sandru** (Norway)  
CAROTENOID COMPOUNDS OUT OF THE ORDINARY

12:00-13:00 Luncheon Seminar-2 Sponsored by Fuji Chemical Industry Co., Ltd. (Mermaid Hall)

13:00-15:00 Poster Viewing & Resort Time

## PARALLEL SESSIONS 4-1 & 5

### **Session 4-1. Photosynthesis and Photochemistry of Carotenoids** (Mermaid Hall)

15:00-15:40 Plenary Lecture: **Hideki Hashimoto** (Japan)  
CUREENT UNDERSTANDING OF THE PHOTOPHYSICS OF CAROTENOIDS

15:40-16:05 Invited Lecture: **Richard J. Cogdell** (UK)  
A DETAILED 'LOOK' AT THE STRUCTURE OF CAROTENOIDS IN  
PHOTOSYNTHETIC PIGMENT-PROTEIN COMPLEXES AS DETERMINED BY  
X-RAY CRYSTALLOGRAPHY, WITH SPECIAL REFERENCE TO REACTION

CENTRES AND LH2 COMPLEXES FROM PURPLE PHOTOSYNTHETIC BACTERIA

- 16:05-16:30 Invited Lecture: **Harry A. Frank** (USA)  
EFFECT OF STRUCTURAL MODIFICATIONS ON THE SPECTROSCOPIC PROPERTIES AND DYNAMICS OF THE EXCITED STATES OF PERIDININ
- 16:30-16:50 **Kazuhiro Yanagi** (Japan)  
LIGHT-HARVESTING FUNCTION OF CAROTENOIDS INSIDE SINGLE-WALL CARBON NANOTUBES
- 16:50-17:15 BREAK
- 17:15-17:40 Invited Lecture: **Jian-Ping Zhang** (China)  
MECHANISMS OF PHOTOINDUCED CAROTENOID RADICAL CATION FORMATION AND CAROTENOID-ISOFLAVONOID INTERACTION AT WATER-LIPID INTERFACE
- 17:40-18:05 Invited Lecture: **Ritsuko Fujii** (Japan)  
CONSTRUCTION OF HYBRID PHOTOSYNTHETIC UNITS USING PERIPHERAL AND CORE ANTENNAE FROM TWO DIFFERENT SPECIES OF PHOTOSYNTHETIC BACTERIA
- 18:05-18:25 **Katsunori Nakagawa** (Japan)  
PROBING THE EFFECT OF THE BINDING SITE ON THE ELECTROSTATIC BEHAVIOR OF A SERIES OF CAROTENOIDS RECONSTITUTED INTO THE LIGHT-HARVESTING 1 COMPLEX FROM PURPLE PHOTOSYNTHETIC BACTERIUM *RHODOSPIRILLUM RUBRUM* DETECTED BY STARK
- 18:25-18:45 **Daisuke Kosumi** (Japan)  
EXCITATION ENERGY DEPENDENCE OF THE S<sub>1</sub> RELAXATION KINETICS IN ALL-*TRANS*- $\beta$ -CAROTENE EXPLORED BY TWO-PHOTON EXCITATION

**Session 5. Carotenoids for Food** (Hall 3)

- 15:00-15:25 Invited Lecture: **Paul S. Bernstein** (USA)  
THE PROTECTIVE ROLE OF DIETARY CAROTENOIDS IN THE HUMAN EYE: INSIGHTS FROM JAPANESE QUAIL AND ASIAN SILKWORMS
- 15:25-15:50 Invited Lecture: **Tatsuya Sugawara** (Japan)  
NEW INSIGHT INTO MARINE CAROTENOIDS AS FOOD COMPONENTS FOR HUMAN HEALTH
- 15:50-16:15 Invited Lecture: **Kazuo Miyashita** (Japan)  
ANTI-OBESITY AND ANTI-DIABETIC EFFECT OF ALLENIC CAROTENOID, FUCOXANTHIN
- 16:15-16:35 **Betty J. Burri** (USA)  
COMPARE HUMAN LYCOPENE AND BETA-CRYPTOXANTHIN ABSORPTION FROM CITRUS FRUITS

- 16:35-16:55 **A.A. Del Villar-Martínez** (Mexico)  
UNDIFFERENTIATED CELLS FROM *Tagetes erecta*: CALLUS GENERATION,  
ULTRASTRUCTURAL ANALYSIS AND PIGMENT PRODUCTION
- 16:55-17:20 BREAK
- 17:20-17:45 Invited Lecture: **Junji Terao** (Japan)  
PROTECTIVE ROLE OF DIETARY  $\beta$ -CAROTENE IN UVA-INDUCED SKIN  
PHOTODAMAGE: A MECHANISTIC APPROACH USING HAIRLESS MICE
- 17:45-18:10 Invited Lecture: **Maria Manuela Mendes-Pinto** (Australia)  
CAROTENOID BREAKDOWN PRODUCTS IN WINE AROMA
- 18:10-18:35 Invited Lecture: **Masako Ogawara** (Japan)  
PRACTICAL ASPECTS OF CAROTENOIDS ANALYSIS IN A THIRD-PARTY
- 18:35-19:00 Invited Lecture: **Takeshi Yasumoto** (Japan)  
POTENTIAL HEALTH BENEFITS OF FUCOXANTHIN
- 19:00-19:20 **Akihiko Nagao** (Japan)  
ACCUMULATION OF CAROTENOIDS AND VITAMINE E AND THEIR  
ANTIOXIDANT ACTIVITY IN HEPG2 CELLS

### Wednesday 25th June

- 09:00-12:00 Poster Viewing & Discussion (Poster Session Hall)
- 12:00-18:00 Conference Excursion to Okinawa Churaumi Aquarium
- 18:30-20:30 Conference Dinner (Mermaid Terrace)

### Thursday 26<sup>th</sup> June

PARALLEL SESSIONS 4-2 & 6-1

#### Session 4-2. Photosynthesis and Photochemistry of Carotenoids (Mermaid Hall)

- 09:00-09:25 Invited Lecture: **Thomas Lenzer** (Germany)  
INVESTIGATION OF INTERNAL CONVERSION DYNAMICS OF  
CAROTENOIDS USING FEMTOSECOND PUMP-SUPERCONTINUUM PROBE
- 09:25-09:50 Invited Lecture: **Marcus Motzkus** (Germany)  
ENERGY FLOW IN CAROTENOIDS STUDIED BY QUANTUM CONTROL  
SPECTROSCOPY
- 09:50-10:10 **Rudi Berera** (Netherlands)  
IDENTIFICATION OF A MECHANISM OF ENERGY DISSIPATION IN

CYANOBACTERIA

10:10-10:35 BREAK

10:35-11:00 Invited Lecture: **Bruno Robert** (France)  
CAROTENOIDS IN PHOTOSYNTHESIS: FUNCTION AND ELECTRONIC  
PROPERTIES

11:00-11:20 **Kawon Oum** (Germany)  
FEMTOSECOND KINETICS STUDIES OF CAROTENOIDS USING TRANSIENT  
LENZ AND TRANSIENT ABSORPTION TECHNIQUES IN ORGANIC SOLVENTS  
AND SUPERCRITICAL FLUIDS

11:20-11:40 **Heiko Lokstein** (Germany)  
PIGMENT-PIGMENT INTERACTIONS IN THE PERIDININ-CHLOROPHYLL  $\alpha$ -  
PROTEIN OF *Amphidinium carterae* INVESTIGATED BY NONLINEAR  
POLARIZATION SPECTROSCOPY IN THE FREQUENCY DOMAIN

**Session 6-1. Medical Applications of carotenoids including vision and cancer therapy**  
(Hall 3)

09:00-09:40 Plenary Lecture: **John W. Erdman Jr.** (USA)  
ARE HEALTH ATTRIBUTES OF LYCOPENE RELATED TO THEIR  
ANTIOXIDANT FUNCTION?

09:40-10:05 Invited Lecture: **Yoshifumi Tomita** (Japan)  
CAROTENOIDS AND IMMUNITY: PREVENTION OF INFECTIOUS DISEASES

10:05-10:25 **Chun Liu** (USA)  
MODULATION OF LUNG MOLECULAR BIOMARKERS BY  $\beta$ -CAROTENE IN  
THE PHYSICIANS' HEALTH STUDY

10:25-10:50 BREAK

10:50-11:15 Invited Lecture: **Hoyoku Nishino** (Japan)  
CANCER PREVENTION BY CAROTENOIDS

11:15-11:35 **Franck Tourniaire** (UK)  
CONSEQUENCES OF GENETIC VARIATIONS IN  $\beta$ -CAROTENE CLEAVAGE  
ENZYMES IN FEMALE VOLUNTEERS

12:00-13:00 Luncheon Seminar-3 Sponsored by Nutrilite Health Institute/Amway Japan Limited  
(Mermaid Hall)

13:00-15:00 Poster Viewing & Resort Time

PARALLEL SESSIONS 6-2 & 7-1

**Session 6-2. Medical Applications of carotenoids including vision and cancer therapy**  
(Hall 3)

- 15:00-15:25 Invited Lecture: **John T. Landrum** (USA)  
LUTEIN AND ZEAXANTHIN: EVIDENCE FOR ACTIVE UPTAKE AND METABOLISM
- 15:25-15:50 Invited Lecture: **Susan T. Mayne** (USA)  
DERMAL CAROTENOIDS AS MEASURED BY RESONANCE RAMAN SPECTROSCOPY AS A BIOMARKER OF CAROTENOID STATUS FOR HUMAN STUDIES
- 15:50-16:15 Invited Lecture: **Fredric Pashkow** (USA)  
DEVELOPMENT OF XANTHOPHYLL CAROTENOIDS FOR THE TREATMENT OF OXIDATIVE STRESS IN CARDIOVASCULAR & THROMBOTIC DISEASE
- 16:15-16:40 BREAK
- 16:40-16:05 Invited Lecture: **Omer Kucuk** (USA)  
LYCOPENE AND SOY IN THE TREATMENT OF PROSTATE CANCER
- 16:05-17:25 **Richard A. Bone** (USA)  
MACULAR PIGMENT DISTRIBUTION IN RELATION TO THE CUMULATIVE LIGHT DISTRIBUTION IN THE HUMAN RETINA
- 17:25-17:50 Invited Lecture: **Xiang-Dong Wang** (USA)  
BIOLOGIC ACTIVITY OF LYCOPENE METABOLITES: IMPLICATIONS FOR CANCER PREVENTION

**Session 7-1. Biosynthesis and Metabolism of Carotenoids** (Mermaid Hall)

- 15:00-15:40 Plenary Lecture: **Gerhard Sandmann** (Germany)  
CAROTENOID BIOSYNTHESIS PATHWAYS: FROM BACTERIAL GENES TO TRANSGENIC PLANTS
- 15:40-16:05 Invited Lecture: **Claudia Schmidt-Dannert** (USA)  
MAKING AND BREAKING OF CAROTENOIDS IN ENGINEERED CELLS
- 16:05-16:30 Invited Lecture: **Paul D. Fraser** (UK)  
THE MANIPULATION OF CAROTENOID BIOSYNTHESIS DURING TOMATO FRUIT RIPENING: EFFECTS ON ISOPRENOIDS, PLASTIDS AND INTERMEDIARY METABOLISM
- 16:30-16:50 **Takashi Sakudoh** (Japan)  
GENE STRUCTURE AND EXPRESSION OF THE CAROTENOID-BINDING PROTEIN RESPONSIBLE FOR CELLULAR CAROTENOID TRANSPORT IN LEPIDOPTERAN INSECTS
- 16:50-17:15 BREAK

- 17:15-17:40 Invited Lecture: **Norihiko Misawa** (Japan)  
 PATHWAY ENGINEERING OF OIL CROPS FOR CAROTENOID PRODUCTION
- 17:40-18:05 Invited Lecture: **Changfu Zhu** (Spain)  
 RECONSTRUCTION AND EXTENSION OF THE CAROTENOID PATHWAY IN  
 MAIZE THROUGH COMBINATORIAL NUCLEAR TRANSFORMATION
- 18:05-18:30 Invited Lecture: **Joseph Hirschberg** (Israel)  
 REGULATION OF CAROTENOID BIOSYNTHESIS: LESSONS FROM  
 MUTATIONAL ANALYSIS IN TOMATO
- 18:30-18:50 **George Britton** (UK)  
 'FEEDING NEMO': CAROTENOID ACCUMULATION IN ANEMONE FISH

### Friday 27<sup>th</sup> June

08:00-09:00 Morning Seminar-2 Sponsored by LycoRed Ltd. (Mermaid Hall)

PARALLEL SESSIONS 7-2 & 8

#### Session 7-2. Biosynthesis and Metabolism of Carotenoids (Mermaid Hall)

- 09:25-09:50 Invited Lecture: **Harry J. Klee** (USA)  
 ACTIVITIES AND FUNCTIONS OF PLANT CAROTENOID CLEAVAGE  
 DIOXYGENASES
- 09:50-10:10 **Gamze Aydin** (Hungary)  
 APO-LYCOPENOIDS ARE BIOACTIVE LYCOPENE METABOLITES
- 10:10-10:35 BREAK
- 10:35-11:00 Invited Lecture: **Hideo Etoh** (Japan)  
 REACTION OF CAROTENOIDS WITH PEROXYNITRITE
- 11:00-11:20 **Kazimierz Strzalka** (Poland)  
 XANTHOPHYLL DE-EPOXIDASES – A NEW GROUP OF ENZYMES  
 REQUIRING LIPID INVERTED HEXAGONAL PHASES
- 11:20-11:40 **Peter Fleischmann** (Germany)  
 SUBSTRATE USAGE AND RELATED REACTION PRODUCTS OF  
 CAROTENOID CLEAVAGE ENZYMES ISOLATED FROM JAPANESE GREEN  
 TEA (*CAMELLIA SINENSIS*)

#### Session 8. Industrial Production of Carotenoids (Hall 3)

- 09:00-09:40 Plenary Lecture: **Hansgeorg Ernst** (Germany)  
 RECENT DEVELOPMENTS IN INDUSTRIAL CAROTENOID SYNTHESIS
- 09:40-10:05 Invited Lecture: **Katsuhiko Takayanagi** (Japan)



$\beta$ -CRYPTOXANTHIN ( $\beta$ -CRX) AND SATSUMA MANDARIN: INDUSTRIAL PRODUCTION AND HEALTH PROMOTING BENEFITS

- 10:05-10:25 **Jayant Deshpande** (India)  
NOVEL TIMED-RELEASE MULTICAROTENOID BEADLETS
- 10:25-10:50 BREAK
- 10:50-11:10 **Juliane Hohbein** (Germany)  
ISOLATION OF LYCOPENE ISOMERS BY COUNTERCURRENT CHROMATOGRAPHY
- 11:10-11:35 Invited Lecture: **Holger Becker** (USA)  
Title Not Decided
- 11:35-12:00 Invited Lecture: **Regina Goralczyk** (USA)  
COMMERCIAL APPLICATIONS FOR CAROTENOIDS AS BEAUTY SUPPLEMENTS FOR SKIN-PHOTOPROTECTION AND ANTIAGING
- 12:00-12:20 CLOSING (Mermaid Hall)

**POSTER PRESENTATIONS**

A NOVEL METHOD FOR THE RECOVERY OF ASTAXANTHIN PRODUCED FROM *PHAFFIA RHODOZYMA*

Maria Dermiki , Mike H. Gordon, and Paula Jauregi

EFFECT OF ASTAXANTHIN SUPPLEMENTED FEEDS ON PIGMENTATION AND CAROTENOID COMPOSITION OF *PAGRUS PAGRUS* SKIN

Noemí Tejera, Juana Rosa Cejas, Covadonga Rodríguez, Salvador Jerez, Ana Bolaños, and Antonio Lorenzo

BLOOD PHARMACOKINETICS OF ASTAXANTHIN IN HUMAN AFTER SINGLE DOSE SUPPLEMENTATION

Yasuhiro Nishida, Yuri Sugiura, Mariko Karato, Eiji Yamashita, Akitoshi Kitamura, Jiro Takahashi, Kiyotaka Nakagawa, Wataru Miki, and Teruo Miyazawa

MICROARRAY PROFILING OF GENE EXPRESSION PATTERNS IN THE LIVER OF ASTAXANTHIN ADMINISTERED METABOLIC SYNDROME MODEL RATS

Yasuhiro Nishida, Eiji Yamashita, and Ushio Sankawa

EFFECTS OF ASTAXANTHIN ON HUMAN BLOOD RHEOLOGY

Jiro Takahashi, Hiromi Miyawaki, Hiroki Tsukahara, and Isao Takehara

IMPACTS OF ASTAXANTHIN ENRICHED *Haematococcus pluvialis* POWDER ON PATHOLOGICAL AND PHYSIOLOGICAL BEHAVIORS OF WISTAR AND BALB/c MICE

Liu Jianguo, He Jun, Zhang Yong, Wei Xiaoli, Gao Hong, and Li Wei

THE EFFECTS OF DIETARY SUPPLEMENTATION OF ALGA HAEMATOCOCCUS PLUVIALIS, SYNTHETIC ASTAXANTHIN AND  $\beta$ -CAROTENE ON SURVIVAL, GROWTH, AND PIGMENT DISTRIBUTION OF RED DEVIL, CICHLASOMA CITRINELLUM

Chih-Hung Pan and Yew-Hu Chien

EFFECTS OF ASTAXANTHIN AND EXERCISE, PROMOTING ENERGY METABOLISM AND SUPPRESSING BODY FAT ACCUMULATION

Mayumi Ikeuchi, Tomoyuki Koyama, Jiro Takahashi, and Kazunaga Yazawa

ASTAXANTHIN SUPPLEMENTATION IMPROVES EXERCISE-INDUCED FATIGUE IN MICE

Mayumi Ikeuchi, Tomoyuki Koyama, Jiro Takahashi, and Kazunaga Yazawa

CAROTENOID AGGREGATES OF PREDEFINED SIZE

Eugenia Mariana Sandru, Hans-Richard Sliwka, and Vassilia Partali

OXIDATION AND ANTIOXIDATION OF CAROTENOIDS – REACTIONS AND PRODUCTS

He Li, Julian Willibald, Sandra Rennebaum, Thor-Bernt Melø, Hansgeorg Ernst, Razi K. Naqvi, Vassilia Partali, Hans-Richard Sliwka

TOTAL SYNTHESSES OF 3,6-EPOXY CAROTENOIDS APPLYING REGIOSELECTIVE RING OPENING OF TETRASUBSTITUTED EPOXIDES

Yumiko Yamano, Masayoshi Ito, and Akimori Wada

AN EFFICIENT SYNTHESIS OF 9Z-RETINOIC ACID AND ITS ANALOGUES USING A PRACTICAL BUILDING BLOCK

Takashi Okitsu, Kinya Iwatsuka, and Akimori Wada

MECHANISM FOR THE CARR-PRICE BLUE COLOUR REACTION OF RETINOIDS

Geir Kildahl-Andersena and Synnøve Liaaen-Jensen

TRANSMEMBRANE LOCALIZATION OF *cis*-ISOMERS OF ZEAXANTHIN

Witold K. Subczynski and Justyna Widomska

EXPEDITIOUS SYNTHESIS OF THE CAROTENOID POLYENE CHAINS BY THE SULFONE OLEFINATION METHOD

Jae-Hong Min, Se-Young Jung, Jung-Taek Oh, Eunho Choi, Jung Eun Yeo, and Sangho Koo

OXIDATIVE DEGRADATION KINETICS OF LUTEIN IN VITRO AND ITS CHARACTERISTIC BREAKDOWN PRODUCTS ANALYZED BY HPLC AND LC-MS TECHNIQUES

Aruna Gorusupudi, Divakar Sounder, and Baskaran Vallikannan

EXPERIMENTS ON THE SYNTHESIS OF CAROTENOID GLYCOSIDES

Veronika Nagy, Attila Agócs, Erika Turcsi, and József Deli

EASY SYNTHESIS OF STABLE ANIONIC CAROTENOID RADICALS

Christer L. Øpstad, Vassilia Partali, Hans-Richard Sliwka, and Thor Bernt Melø

CATIONIC CAROTENOID AMPHIPHILES AS GENE TRANSFECTION VECTORS

Christer L. Øpstad, Vassilia Partali, Hans-Richard Sliwka, and Michael D. Pungente

QUENCHING ACTIVITIES OF COMMON HYDROPHILIC AND LIPOPHILIC ANTIOXIDANTS AGAINST SINGLET OXYGEN

Yasuhiro Nishida, Eiji Yamashita, Vincent Wood, and Wataru Miki

ANALYSIS OF CAROTENOIDS IN HUMAN SERUM BY ULTRA PERFORMANCE LIQUID CHROMATOGRAPHY

Takashi Nakajima, Takashi Wada, Yoshizoh Yuasa, and Takashi Maoka

SYNTHESES OF PERIDININ ANALOGUES TOWARD ELUCIDATION OF ITS HIGHLY EFFICIENT ENERGY TRANSFER MECHANISM IN PHOTOSYNTHESIS

Takayuki Kajikawa, Kazuyoshi Aoki, Takashi Iwashita, Nirmalya Chatterjee, Harry A. Frank, Toshiyuki Kusumoto, Hideki Hashimoto, and Shigeo Katsumura

TOTAL SYNTHESIS OF LUTEIN AND ITS STEREOISOMERS

An-Ni Chang and Frederick Khachik

TOTAL SYNTHESIS OF ZEAXANTHIN AND ITS STEREOISOMERS

An-Ni Chang and Frederick Khachik

PARTIAL SYNTHESIS OF (3R,3'R)-ZEAXANTHIN AND (3R,3'S;MESO)-ZEAXANTHIN FROM (3R,3'R,6'R)-LUTEIN VIA (3R)-3',4'-ANHYDROLUTEIN

Frederick Khachik and An-Ni Chang

TOWARDS CAROTENOID DENDRIMERS

Attila Agócs, Magdolna Háda, Veronika Nagy, József Deli

CONFORMATION OF END-GROUPS AS A DETERMINANT OF CAROTENOID TOPOLOGY: A STUDY OF  $\beta$ - AND  $\epsilon$ -END-GROUPS

John T. Landrum, David Chatfield, Alex A. Mebel, Francesca Alvarez-Calderon, and Melissa Fernandez

BIOLOGICAL PROPERTIES OF DITAXIN AND HETERANTHIN: APOCAROTENOIDS PRESENT IN AZAFRAN DE BOLITA (DITAXIS HETERANTHA.ZUCC)

Herry H. Permady, E. Ramón-Gallegos, Eugenia C. Lugo-Cervantes, and Maria E. Jaramillo-Flores

SUPERCritical FLUID CHROMATOGRAPHY FOR THE ISOLATION AND CHARACTERISATION OF PALM CAROTENOIDS

Ng Mei Han, Choo Yuen May, and Mohd. Basri Wahid

SEARCH OF CAROTENOID-PRODUCING MARINE MICROORGANISMS AROUND THE CORAL REEFS OF THE KERAMA ISLANDS OF OKINAWA

Yasuji Sumiya, Satoshi Morita, Yasuhiro Nishida, Hideyuki Sakaki, Miyuki Tsushima, Wataru Miki, Jin Tanangonan, Akiyoshi Sawabe, Yoshikazu Sakagami, and Sadao Komemushi

REAL-TIME STUDY OF THE CHEMICAL MODIFICATIONS OF TOMATO CAROTENOIDS

DURING THERMAL TREATMENT

Daniel Rubio-Diaz, David Francis, and Luis Rodriguez-Saona

CONSISTENCY OF CORRELATIONS OF SERUM AND SKIN CAROTENOIDS AS MEASURED BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY AND RAMAN SPECTROSCOPY

Steven Wood, Angela Mastaloudis, Joseph Carlson, Jeffrey Zidichouski, Richard Holubkov, James Reading, Shayn Stavens, E. Wayne Askew, Jason D. Morrow, Ginger L. Milne, Stephen Poole, and Mark Bartlett

DIABATIC EXCITATION AND RELAXATION IN A PAIR OF OPTICALLY-ALLOWED  $1B_{11}^+$  STATE AND OPTICALLY-FORBIDDEN  $1B_{11}^-$  OR  $3A_g^-$  STATE: EFFECTS OF EXCITATION-PULSE DURATION, MOLECULAR SYMMETRY AND SOLVENT POLARITY

Yasushi Koyama, Yoshinori Kakitani, and Hiroyoshi Nagae

MECHANISMS OF PHOTOINDUCED CAROTENOID RADICAL CATION FORMATION AND CAROTENOID-ISOFLAVONOID INTERACTION AT WATER-LIPID INTERFACE

Rui-Min Han, Yu-Xi Tian, Leif H. Skibsted, and Jian-Ping Zhang

OPTICALLY "DARK" STATES OF XANTHOPHYLLS IN THE MAJOR PLANT LIGHT-HARVESTING COMPLEX STUDIED BY FEMTOSECOND TWO-PHOTON EXCITATION SPECTROSCOPY

Alexander Betke, Bernd Voigt, Ralf Menzel, and Heiko Lokstein

PHOTOINDUCED HYDROGEN PRODUCTION WITH LIGHT-HARVESTING CHLOROPHYLL *A/B*-PROTEIN COMPLEX OF PHOTOSYSTEM II (LHCII) FROM SPINACH AND PLATINUM NANOPARTICLE SYSTEM

Yutaka Amao, Yuko Maki, and Yukari Abe

ULTRAFast EXCITED ENERGY TRANSFER OF  $\beta$ -CAROTENE IN SINGLE-WALLED CARBON NANOTUBES

Masayuki Yoshizawa, Kenta Abe, Daisuke Kosumi, Kazuhiro Yanagi, Yasumitsu Miyata, and Hiromichi Kataura

STRUCTURE OF THE CAROTENOID BOUND TO THE REACTION CENTRE FROM *BLASTOCHLORIS VIRIDIS*

Aleksander W. Roszak, Alastair T. Gardiner, Vladimira Moulisova, Adhie D. Putranto, Ritsuko Fujii, Hideki Hashimoto, Neil W. Isaacs, and Richard J. Cogdell

RECONSTITUTION OF LIGHT-HARVESTING 1 COMPLEXES FROM THE PURPLE PHOTOSYNTHETIC BACTERIUM RHODOSPIRILLUM RUBRUM WITH SEPARATELY ISOLATED POLYPEPTIDES (LH1- $\alpha$  AND LH1- $\beta$ ), BACTERIOCHLOROPHYLL *a*, AND CAROTENOID

Tsubasa Nakano, Naomi Fukui, Katsunori Nakagawa, Alastair T. Gardiner, Richard J. Cogdell, Ritsuko Fujii, Hideki Hashimoto, and Mamoru Nango

RECONSTITUTION OF ANTENNA LIGHT-HARVESTING 1 COMPLEXES FROM THE PURPLE PHOTOSYNTHETIC BACTERIUM RHODOBACTER SPHAEROIDES WITH LH1-POLYPEPTIDES, BACTERIOCHLOROPHYLL *a*, AND CAROTENOIDS: CAROTENOID SPECIFICITY

Naomi Fukui, Ayumi Mizuno, Tsubasa Nakano, Katsunori Nakagawa, Alastair T.

Gardiner, Richard J. Cogdell, Ritsuko Fujii, Hideki Hashimoto, and Mamoru Nango

RESONANCE RAMAN SPECTROSCOPY OF  $\beta$ -CAROTENE HOMOLOGUES CONTAINING DIFFERENT  $\pi$ -CONJUGATION LENGTHS AND SIDE CHAIN DISTRIBUTIONS

Andrew Gall, Masazumi Fujiwara, Kensei Yamauchi, Mitsuru Sugisaki, Bruno Robert, and Hideki Hashimoto

A NEW OPTICALLY-FORBIDDEN EXCITED STATE IN  $\beta$ -CAROTENE HOMOLOGUES: INVESTIGATED BY THIRD-HARMONIC GENERATION SPECTROSCOPY

Masazumi Fujiwara, Kensei Yamauchi, Mitsuru Sugisaki, Kazuhiro Yanagi, Andrew Gall, Bruno Robert, Richard J. Cogdell, and Hideki Hashimoto

SUB-20 FS TIME-RESOLVED DEGENERATE FOUR-WAVE MIXING SPECTROSCOPY OF  $\beta$ -CAROTENE AND LYCOPENE

Masazumi Fujiwara, Mitsuru Sugisaki, Andrew Gall, Bruno Robert, Richard J. Cogdell, and Hideki Hashimoto

SPECTRALLY-RESOLVED TRANSIENT GRATING SIGNAL OF  $\beta$ -CAROTENE

Mitsuru Sugisaki, Masazumi Fujiwara, Selvakumar V. Nair, Harry E. Ruda, Richard J. Cogdell, and Hideki Hashimoto

TRANSIENT GRATING SPECTROSCOPY IN *Rhodobacter sphaeroides* 2.4.1

Mitsuru Sugisaki, Masazumi Fujiwara, Ritsuko Fujii, Katsunori Nakagawa, Mamoru Nango, Richard J. Cogdell, and Hideki Hashimoto

ELECTROABSORPTION SPECTROSCOPY OF NATIVE AND RECONSTITUTED LH1 COMPLEXES FROM PURPLE PHOTOSYNTHETIC BACTERIUM *RHODOSPIRILLUM RUBRUM*

Tomoko Horibe, Katsunori Nakagawa, Toshiyuki Kusumoto, Satoru Suzuki, Ritsuko Fujii, Alastair T. Gardiner, Richard J. Cogdell, Mamoru Nango, and Hideki Hashimoto

STARK SPECTROSCOPY OF PERIDININ AND ITS DERIVATIVES

Toshiyuki Kusumoto, Tomoko Horibe, Takayuki Kajikawa, Kazuyoshi Aoki, Singh Ram Shanker, Takashi Iwashita, Shigeo Katsumura, and Hideki Hashimoto

$\pi$ -CONJUGATION CHAIN LENGTH DEPENDENCE OF THE DICATION STATE OF POLAR CAROTENOID ANALOGUES MEASURED BY NANOSECOND TIME-RESOLVED ABSORPTION SPECTROSCOPY

Toshiyuki Kusumoto, Ritsuko Fujii, and Hideki Hashimoto

FEMTOSECOND TIME-RESOLVED ABSORPTION SPECTROSCOPY OF A POLAR CAROTENOID ANALOGUE, 2-(ALL-TRANS-RETINYLIDENE) INDAN-1,3-DIONE

Toshiyuki Kusumoto, Tomoaki Hashimoto, Ritsuko Fujii, Mitsuru Sugisaki, and Hideki Hashimoto

FEMTOSECOND TIME-RESOLVED ABSORPTION SPECTRA OF PHOTOSYNTHETIC MEMBRANES FROM A PURPLE BACTERIUM *BLASTOCHLORIS (RHODOPSEUDOMONAS) VIRIDIS*

Ritsuko Fujii, Nobuyuki Wakatake, Shozo Shimonaka, Qi-Dai Chen, Mitsuru Sugisaki,

Alastair T. Gardiner, Richard J. Cogdell and Hideki Hashimoto

COHERENT DYNAMICS OF EXCITATION-ENERGY TRANSFER IN REACTION CENTER OF PHOTOSYNTHETIC PURPLE BACTERIA DESCRIBED BY GLOBAL THEORY

Keisuke Saito and Hideki Hashimoto

THE INTERACTION OF MACROCYCLIC Ag AND Cu COMPLEXES WITH CAROTENOID

Isamu Kinoshita, Masakazu Hirotsu, Takanori Nishioka, and Hideki Hashimoto

FT-IR DIFFERENCE SPECTRUM OF A 15-*CIS* CAROTENOID BOUND TO THE REACTION CENTRE FROM A PURPLE PHOTOSYNTHETIC BACTERIUM *RHODOBACTER SPHAEROIDES*

Emiko Shibata, Ritsuko Fujii, and Hideki Hashimoto

ENHANCEMENT OF HEPATIC DHA IN MICE BY DIETARY FUCOXANTHIN

Takayuki Tsukui, Masashi Hosokawa, and Kazuo Miyashita

DOWN-REGULATION OF INFLAMMATORY CYTOKINES IN MACROPHAGE RAW264.7 CELLS BY MARINE CAROTENOIDS

Izumi Konishi, Nana Mikami, Masashi Hosokawa, Tokutake Sashima, Takashi Maoka, and Kazuo Miyashita

AN EFFICIENT CONVERSION OF (3R,3'R,6R)-LUTEIN TO (3R,3'S) trans-meso-ZEAXANTHIN

T.K. Sunil Kumar, M.L. Shankaranarayana, and Jayant Deshpande

$\beta,\kappa$ -CAROTEN-6'-ONE, A NEW CAROTENOID FROM PANAMANIAN FRUIT

Reinaldo McLean, Enrique Murillo, and George Britton

INVESTIGATION OF THE CAROTENOID COMPOSITION OF DIFFERENT KINDS OF FRESH AND COOKED PUMPKINS (*CUCURBITA MAXIMA*)

Erika Turcsi, Krisztina Marton, Péter Oláh, and József Deli

CAROTENOID ANALYSIS OF FLOWERS AND INFLORESCENCES OF SOME MEDICINAL PLANTS

Erika Turcsi, Györgyi Horváth, Péter Molnár, László Gy. Szabó, and József Deli

AN INVESTIGATION OF BIOCHEMICAL COMPOUNDS CONTRIBUTING TO COLOR OF KINA ROE

Daniel Garama, Mike Barker, Phil Bremer, and Alan Carne

ESTIMATION OF LUTEIN, LYCOPENE AND  $\beta$ -CAROTENE LEVELS IN COMMONLY CONSUMED INDIAN FRUITS AND VEGETABLES

T. Velpandian, C. Gayathri, Supriyo Ghose, and Alok K. Ravi

COMPREHENSIVE LCxLC-PDA-MS APPLIED FOR THE ANALYSES OF FREE CAROTENOIDS AND CAROTENOID ESTERS IN CITRUS PRODUCTS

Daniele Giuffrida, Paola Dugo, Miguel Herrero, Tiina Kumm, and Luigi Mondello

SERIAL COUPLED COLUMNS REVERSED-PHASE SEPARATIONS TO ANALYZE CAROTENOIDS FROM NATURAL MATRICES

Miguel Herrero, Francesco Cacciola, Daniele Giuffrida, Giacomo Dugo, Paola Dugo,

and Luigi Mondello

BIOCHEMICAL AND MOLECULAR CHARACTERIZATION OF HIGH CAROTENE SWEET PEPPER MUTANTS (*CAPSICUM ANNUUM L.*)

Nasya Tomlekova, Svetla Yancheva, Velichka Todorova, Ivelin Panchev, Desislava Marinova, Jean-Pierre Baudoin, and Stefan Daskalov

ORANGE-FLESHED SWEET POTATO AS A FOOD-BASED INTERVENTION TO ADDRESS VITAMIN A DEFICIENCY IN WOMEN OF REPRODUCTIVE AGE IN BANGLADESH

Kazi M. Jamil, Marjorie Haskell, Mohammad Hossain, M.K.R. Bhuiyan, and Kenneth H. Brown

ANALYSIS OF CAROTENOIDS IN FOODS USING LC-NMR

Chisato Tode, Takashi Maoka, and Makiko Sugiura

BIOLOGICAL PROPERTIES OF DITAXIN AND HETERANTHIN: APOCAROTENOIDS PRESENT IN AZAFRAN DE BOLITA (*DITAXIS HETERANTHA.ZUCC*)

Herry H. Permady, E. Ramón-Gallegos, Eugenia C. Lugo-Cervantes, and Maria E. Jaramillo-Flores

SQUASH FLOWER HYPOLIPIDEMIC EFFECT IN HYPERCHOLESTEROLEMIC MICE

Rocío Martínez, Ma. Eugenia Jaramillo, Liliana Alamilla, Leticia Garduño, and German Chamorro

EFFECT OF CAROTENOIDS ON OXIDATIVE STRESS INDUCED MITOCHONDRIA-RELATED APOPTOTIC PATHWAYS

József Deli, Krisztina Kovács, Veronika Nagy, and Balázs Sümegei

CYTOTOXICITY OF MARINE CAROTENOIDS IN HUMAN PROMYELOCYTIC LEUKEMIA HL-60 CELLS

Kenji Noda, Takeshi Okubo, Yukihisa Tanaka, Tatsuya Sugawara, and Takashi Hirata

LYCOPENE SUPPRESSES THE PROLIFERATION OF HUMAN COLON CANCER CELLS VIA DOWN-REGULATION OF AKT SIGNALING PATHWAY

Feng-Yao Tang, Chung-Jin Shih, Hsin-Ju Cho, Li-Hao Cheng, and Hsin-Jung Ho

CHOLLEA REDUCED PLASMA TRIACYLGLYCEROLS BUT NOT CHOLESTEROL IN HAMSTERS FED A DIET ENRICHED IN CHOLESTEROL

Yu-Chen Chien, Peng Ting, Yu-Han Chang, Hin-Pang Chang, Tsung-Wei Yang, Hsin-Chieh Wu, and Meng-Tsan Chiang

LUTEIN CONCENTRATIONS OF HUMAN PREMATURE AND TERM BREAST MILKS

Yasuhiro Arai, Yumi Sano, Kyoichi Oshida, Zoraida DeFreitas, Naohiro Gotoh, Toshiaki Shimizu, and Shun Wada

EFFECT OF AN APHANIZOMENON FLOS AQUAE EXTRACT (KLAMIN®) ON THE WELL BEING AND CAROTENOIDS STATUS OF MENOPAUSAL WOMEN: A PRELIMINARY STUDY

Alessandro Genazzani, Serena Benedetti, Stefano Scoglio, Franco Canestrari, and Francesco Marotta

CAROTENOID CONTENT IN DIFFERENT VARIETIES OF APPLES

M. Graça Dias, M. Filomena G.F.C. Camões, and Luísa Oliveira

DIFFERENTIAL ACCUMULATION OF CAROTENOIDS IN PEEL AND FLESH OF WHITE- AND RED-FLESHED LOQUAT FRUITS

Changjie Xu, Chunhua Zhou, and Kunsong Chen

PLASMA CAROTENOIDS AND DISEASE-FREE SURVIVAL IN THE WHEL STUDY

Cheryl L. Rock, Loki Natarajan, Minya Pu, and John P. Pierce

THE ROLE OF XANTHOPHYLLS IN VISUAL PERFORMANCE - LUTEIN AND ZEAXANTHIN'S EFFECTS BEYOND DISEASE PREVENTION - A LITERATURE OVERVIEW

Wolfgang Schalch

THE MODULATION OF CAVEOLIN-1 AS A NOVEL MECHANISM FOR THE ANTITUMORAL EFFECTS OF BETA-CAROTENE IN HUMAN COLON AND PROSTATE CANCER CELLS

Paola Palozza

CAROTENOIDS INHIBIT OXYSTEROL-INDUCED OXIDATIVE, INFLAMMATORY AND CYTOTOXIC DAMAGE IN IN VITRO AND IN VIVO STUDIES: POTENTIAL ROLE IN

Paola Palozza and Maria Cristina Mele

DIETARY LUTEIN INHIBITS DSS-INDUCED COLITIS AND ASSOCIATED COLORECTAL CARCINOMA DEVELOPMENT IN MICE

Chun Liu, Roderick T. Bronson, Donald E. Smith, Robert M. Russell, and Xiang-Dong Wang

LYCOPENE UPTAKE TO MONGOLIAN GERBIL ATTENUATES APOPTOSIS IN HIPPOCAMPUS INDUCED BY ISCHEMIA

Gaku Matsumoto, Kimikazu Fujita, Nobuko Yoshimoto, Toshiaki Kato, Takahiro Inakuma, Yutaka Nagata, and Eiichi Miyachi

DO LYCOPENE METABOLITES/OXIDATION PRODUCTS INHIBIT THE GROWTH OF MOUSE EMBRYONIC FIBROBLASTS THROUGH A CONNEXIN 43 GAP JUNCTION INDEPENDENT

Brian L. Lindshield, Krystle E. Zuniga, and John. W. Erdman Jr.

REDUCING EFFECT OF  $\beta$ -CRYPTOXANTHIN EXTRACTED FROM SATSUMA MANDARIN ON HUMAN BODY FAT

Yoshiyuki Shirakura, Katsuhiko Takayanagi, and Katsuyuki Mukai

EFFECTS OF SOLUBLE FIBERS ON CAROTENOID MICELLIZATION AND UPTAKE BY CACO-2 CELLS IN VITRO

Lina Yonekura, Vallikannan Baskaran, and Akihiko Nagao

THE  $\beta$ -CAROTENE METABOLITE APO-14'-CAROTENOIC ACID IS A POTENT RAR AND RXR ACTIVATING DERIVATIVE AND ENDOGENOUSLY PRESENT IN HUMANS

Ralph Rühl, Gamze Aydin, Eva Papp, Achim Bub, and Bernhard Watzl

TIME-DEPENDENT DIFFERENCES IN LUTEIN CONCENTRATION IN PLASMA VERSUS OPTICAL DENSITY OF MACULAR PIGMENT



Kati Fröhlich, Volker Böhm, Dietrich Schweitzer, Jens Dawczynski, Susanne Jentsch,  
and Jürgen Strobel

HOW MUCH LYCOPENE IS DELIVERED TO DIFFERENT TYPES OF CELLS? AN UPDATE ON  
LYCOCARD'S RESEARCH

Volker Böhm, Kati Fröhlich, Rosella Simone, Paola Palozza, Christine Jacob,  
Kerstin Daemen, Mario Lorenz, and Verena Stangl

CIGARETTE SMOKE AND LYCOPENE

Daniel L. Graham, Khalid Rahman, and Gordon M. Lowe

P38 MAPK PATHWAY IS IMPLICATED IN THE INDUCTION OF GADD45A AND G1 ARREST  
BY FUCOXANTHIN IN HEPG2 CELLS BUT NOT IN DU145 CELLS

Yoshiko Satomi and Hoyoku Nishino

CONCENTRATION DEPENDENT ANTI-OXIDANT OR PRO-OXIDANT EFFECTS OF DIETARY  
 $\beta$ -CAROTENE IN RAT LIVER MITOCHONDRIA

Vijitha Senanayake and Yoshifumi Tomita

LIFE STYLE AND PLASMA CAROTENOID LEVELS IN HEALTHY AGED POPULATION

Yoshifumi Tomita, Tomoko Yoshioka, Eriko Nishio, Katsumi Koga, Hiroyuki  
Takenaka, Minoru Hamada, Kazuyoshi Koizumi, Shingo Ishikawa, and Takahiro

EFFECT OF VEGETABLE JUICE (PETIT VERT) INTAKE ON THE RESISTANCE TO *LISTERIA*  
INFECTION IN MICE

Masayuki Naito, Yoshifumi Tomita, Tohru Toyokawa, Eriko Nishio, Katsumi Koga,  
Hiroyuki Takenaka, Minoru Hamada, Kazuyoshi Koizumi, Shingo Ishikawa, and  
Takahiro Inakuma

MEDICINAL UTILITIES OF CAROTENOIDS FROM *NYCTANTHES ARBOR-TRISTIS*

Sandip Shelke, Omkar Amrite, Pallavi Bhuskat, and Chhaya Gadgoli

SERUM CAROTENOID AND TOCOPHEROL LEVELS AND THE RISK OF ATOPIC  
DERMATITIS AND ASTHMA IN CHILDREN

Noriko Bando, Hironobu Katagawa, Rintaro Yamanishi, Shinichi Sugiyama,  
Satoshi Sasaki, Masayuki Okuda, and Junji Terao

XANTHOPHYLLS ARE PREFERENTIALLY TAKEN UP COMPARED TO  $\beta$ -CAROTENE BY  
RETINAL CELLS VIA A SCAVENGER RECEPTOR BI-DEPENDENT MECHANISM

Alexandrine During, Sundari Doraiswamy, and Earl H. Harrison

LYCOPENE PREVENTS ENVIRONMENTAL INSULTS FOR PREMATURE SKIN AGING

Hirono Sasaki, Hironobu Mori, Takahiro Inakuma, and Akimichi Morita

ENGINEERING OF CAROTENOID PRODUCTION IN FLAXSEED AND RAPESEED BY  
INTRODUCTION OF BACTERIAL GENES

Masaki Fujisawa, Mio Watanabe, Song-Kang Choi, Maki Teramoto, Hisashi Harada,  
Eiji Takita, Nozomu Sakurai, Daisuke Shibata, Kanji Ohyama, and Norihiko Misawa

DIAPOLYCOPENEDIOIC ACID XYLOSYL ESTERS A, B, AND C, NOVEL ANTIOXIDATIVE

GLYCO-C30-CAROTENOIC ACIDS PRODUCED BY A NEW MARINE BACTERIUM  
*RUBRITALEA SQUALENIFACIENS*

Kazutoshi Shindo, Emiko Asagi, Aya Sano, Eri Hotta, Noriko Minemura, Kanae Mikami, Emiko Tamesada, Shinichi Takaichi, Norihiko Misawa, and Takashi Maoka

EFFICIENT PRODUCTION OF CAROTENOIDS USING *ESCHERICHIA COLI* CELLS ENGINEERED IN UPSTREAM ISOPRENOID PATHWAY

Hisashi Harada, Masaki Fujisawa, Tomohisa Kuzuyama, Ryutaro Utsumi, and Norihiko Misawa

HIGH DOSE LYCOPENE SUPPLEMENTATION INCREASES HEPATIC CYP2E1 PROTEIN AND INFLAMMATION IN ALCOHOL-FED RATS

Sudipta Veeramachaneni, Lynne M. Ausman, Sang Woon Choi, Robert M. Russell, and Xiang-Dong Wang

ENZYMATIC METABOLITES OF LYCOPENE INDUCE NRF2-MEDIATED EXPRESSION OF PHASE II DETOXIFYING/ANTIOXIDANT ENZYMES IN HUMAN BRONCHIAL EPITHELIAL CELLS

Fuzhi Lian and Xiang-Dong Wang

APO-10'-LYCOPENOIC ACID FUNCTIONS AS A PEROXISOME PROLIFERATOR-ACTIVATED RECEPTOR  $\gamma$  ACTIVATOR AND INHIBITS LIVER CELL GROWTH BOTH IN VITRO AND IN VIVO OB/OB MICE TREATED WITH DIETHYLNITROSAMINE

Kang-Quan Hu, Yan Wang, Robert M. Russell, and Xiang-Dong Wang

DIFFERENTIAL EXPRESSION OF CAROTENE-15, 15'-OXYGENASE AND CAROTENE-9', 10'-OXYGENASE IN SELECTED FERRET TISSUES AFTER  $\beta$ -CRYPTOXANTHIN SUPPLEMENTATION

Jonathan R. Mein, Chun Liu, and Xiang-Dong Wang

ACTIVATION OF MICRORNA156B REPRESSES CAROTENOID CLEAVAGE DIOXYGENASE GENES AND ENHANCES CAROTENOID LEVELS IN SEEDS OF *ARABIDOPSIS THALIANA*

Abdelali Hannoufa, Shu Wei, George G. Khataktourians, Dwayne D. Hegedus, and Isobel Parkin

IS IT POSSIBLE TO ENHANCE CAROTENOID COMPOSITION OF *ARTEMIA* BY FEEDING THE ALGAL PRODUCT NATUROSE™? RELEVANCE FOR FISH LARVAE PRODUCTION

Covadonga Rodríguez, Noemí Tejera, Nieves Guadalupe Acosta, Noemí Fabelo, and Antonio Lorenzo

REACTION OF 1,2-EPOXYLYCOPENE WITH PEROXYNITRITE

Yuya Yomoda, Aditya Kulkarni, Takashi Maoka, Yukimasa Terada, Hironobu Mori, Takahiro Inakuma, and Hideo Etoh

THE ANTIOXIDANT CAPACITY RESPONSE TO HYPOXIA STRESS OF CHARACINS *HYPHESSOBRYCON CALLISTUS* FED DIETS SUPPLEMENTED WITH CAROTENOID

Chih-Hung Pan, Yew-Hu Chien, and Yi-Juan Wang

STOPPED-FLOW KINETICS OF THE BINDING OF RETINOL AND DERIVATIVES THEREOF TO HUMAN SERUM ALBUMIN

Ulla Christensen

EXPRESSION OF CAROTENOGENIC GENES AND COLOUR DEVELOPMENT IN WILD RELATIVES OF TOMATO

Antonio J. Meléndez-Martínez, Paul D. Fraser, and Peter M. Bramley

LIGHT EFFECT ON MARIGOLD (*TAGETES ERECTA*) PLASTIDS DURING FLOWER DEVELOPMENT

Pérez-Escalante, V., Ríos-Salomé, L.B., Benítez-García, I., Jiménez-Aparicio, A.R., Cruz-Hernández, A., Quintero-Gutiérrez, A.G., López-Villegas, E.O., Vanegas-Espinoza, P.E., and Del Villar-Martínez, A.A.

COLOUR OF SMOKED ATLANTIC SALMON (*SALMO SALAR*) TREATED WITH SODIUM NITRITE

Jørgen Lerfall, Bjørn Bjerkgeng, and Marianne Østerlie

SCREENING OF CAROTENOIDS PRODUCING MARINE BACTERIA AND OPTIMIZATION OF MICROBIAL CAROTENOIDS PRODUCTION

Akkharawit Kanjana-Opas and Theerasak Anantapong

STUDY OF THE NEGATIVE EFFECT EXERTED BY GLUCOSE OVER THE MICROBIAL BIOCONVERSION OF LUTEIN INTO TOBACCO AROMA COMPOUNDS

Eduardo Rodríguez-Bustamante, Gabriela Maldonado-Robledo, Blanca I. Aldana, Roberto Arreguín-Espinosa, and Sergio Sánchez

POSSIBLE DEGRADATION/BIOTRANSFORMATION OF LUTEIN *IN VITRO* AND *IN VIVO*: ISOLATION AND STRUCTURAL ELUCIDATION OF LUTEIN METABOLITES BY HPLC AND LC-MS (APCI)

Lakshminarayana Rangaswamy, Aruna Gorusupudi, Sangeetha Ravi Kumar, Bhaskar Narayan, Divakar Sounder, and Baskaran Vallikannan

BIOTRANSFORMATION OF FUcoxANTHIN AND STRUCTURAL ELUCIDATION OF ITS METABOLITES IN RETINOL DEFICIENT RATS BY HPLC AND LC-MS (APCI)

Sangeetha Ravi Kumar, Baskar Narayan, Divakar Sounder, and Baskaran Vallikannan

2-OH-MYXOL 2'-FUCOSIDE AND NOSTOXANTHIN IN THE THERMOPHILIC CYANOBACTERIUM, *Thermosynechococcus elongatus*: BIOSYNTHESIS AND GENES

Masako Iwai, Takashi Maoka, Masahiko Ikeuchi, and Shinichi Takaichi

FUCOSYLTRANSFERASE AND  $\beta$ -CAROTENE HYDROXYLASE FOR MYXOL 2'-FUCOSIDE SYNTHESIS IN *Anabaena* sp. PCC 7120, COMPARED WITH *Synechocystis* sp. PCC 6803

Mari Mochimaru, Hajime Masukawa, Takashi Maoka, and Shinichi Takaichi

A COLORIMETRIC WHOLE-CELL BIOSENSOR TO DETECT ARSENITE BASED ON THE CAROTENOGENIC REACTION BY CrtI IN *Rhodospseudomonas palustris*

Kazuyuki Yoshida, Koichi Inoue, Shinichi Takaichi, and Isamu Maeda

CAROTENOIDS IN THE NEW PHYLUM BACTERIUM, *Gemmatimonas aurantiaca*: OSCILLOL 2,2'-DIRHAMNOSIDE, BIOSYNTHESIS AND GENES

Shinichi Takaichi, Takashi Maoka, Kazuto Takasaki, and Satoshi Hanada

CAROTENOGENESIS IN CYANOBACTERIA: OVERVIEW

Shinichi Takaichi

ENZYMIC NORISOPRENOID FORMATION IN PETALS OF ROSA HYBRIDA 'PAREO'

Susanne Baldermann, Peter Fleischmann, and Naoharu Watanabe

CAROTENOID PRODUCTION SQUALENE SYNTHASES

Akinori Katabami, Yosuke Nakatani, Maiko Furubayashi, Mayu Ikezumi, Kyoichi Saito,

PREPARATION AND CHARACTERIZATION OF WATER SOLUBLE CAROTENOID /  
CYCLODEXTRIN COMPLEXES

József Deli, Attila Agócs, Róbert Iványi, Krisztina Németh, Júlia Visy, Julianna Szemán,  
Lajos Szente, and Miklós Simonyi

FUNGAL HYDROLYSIS OF CROCIN

Tina Beate Bjørk, Vassilia Partali, and Hans-Richard Sliwka

INHERENTLY COLORED SOAPS

Inger-Lise Alsvik, Hansgeorg Ernst, Vassilia Partali, and Hans-Richard Sliwka

CAROTENYL-FLAVONOIDS: A NOVEL GROUP OF BIFUNCTIONAL ANTIOXIDANTS

C. Hundsdorfer, P. Noack, H. Ernst, W. Schrader, W. Stahl, and H.-D. Martin

FUCOXANTHIN LARGE VARIETY OF BIOLOGICAL ACTIVITY FROM BROWN ALGAE  
*CLADOSIPHON OKAMURANUS*

Yoshiro Inuma, Masahiko Iha, Tomonori Taira, and Keiko Oguchi