EuroMed CitrusNet

Euro-Med Citrus

Safe and High Quality Supply Chains and Networks for the Citrus Industry between Mediterranean Partner Countries and Europe

This project is funded by the European Commission under the Thematic Priority 5: Food Quality and Safety

Newsletter nr 2 / 2007

EUROMEDCITRUSNET FIRST PROJECT WORKSHOP

On 26th June, EuroMedCitrusNet, held its First Project Workshop on citrus supply chain safety and quality at Cukurova University, Adana, Turkey.

This workshop was an excellent opportunity for Mediterranean citrus sector organizations (research institutions, networks, and industry) to increase their awareness of activities across the Mediterranean. Over 20 different organizations from France, Portugal, Spain, Italy, Greece, the Turkish Republic of Northern Cyprus, Turkey, Egypt, Israel and Morocco participated. In addition to project partnership presentations, invited speakers from the following organizations also gave valuable contributions:

- Mediterranean Agronomic Research Institute Bari, Italy,
- CSIC Institute of Geography and Economics, Spain
- Biohim, Greece
- The Volcani Center, Department of Citriculture, Israel
- Maroc Fruit Board, Morocco
- The Department of Agriculture, Turkish Republic of Northern Cyprus
- Union of Adana Citrus Growers
- University of Palermo, Italy
- Ozler Ziraat, Turkey

The workshop report and presentations can be viewed on the project website at www2.spi.pt/euromedcitrusnet.

In addition to the coordinator SPI, Portugal, the EuroMedCitrusNet project is being conducted by a number of highly prestigious institutions including:

- University of Catania, Italy; Cukurova University, Turkey;
- National Agricultural Research Foundation, Greece;
- Euroquality, France;
- Asociacion de Investigacion de la Industria Agroalimentaria ainia, Spain;
- Institut Agronomique et Veterinaire Hassan II, Morocco;
- Horticultural Research Institute, Egypt; Institut National Agronomique de Tunisie, Tunisia;
- Conzorcio Euroagrumi O. P., Italy;
- Station D'Emballage D'Agrumes Kabbage Souss, Morocco.

These organizations will promote improved safety and quality of Mediterranean citrus supply chains through:

- A study of current policies, procedures and research related to the Mediterranean citrus sector to improve quality and safety of citrus supply chains;
- A needs assessment survey to focus research on improving safety and quality including policy recommendations, an action plan of research agendas and preliminary project proposals;
- Mediterranean Networking initiatives to stimulate international co-operation and support policy development by integrating current related research and providing added value;
- Providing information to facilitate access to knowledge, training and technology, increasing SME participation in research, and, thus, improving the exploitation of results, and accelerating innovation.

They aim to bring together scientists and industrialists to create a sustainable Mediterranean citrus network.

The First EuroMedCitrusNet Workshop began with a Welcome from Cukurova University. These welcoming speeches were provided by Prof. Yesiloglu, Head of the Department of Horticulture, a Partner in the EuroMedCitrusNet project and responsible for the organization and hosting of the First EuroMedCitrusNet Project Workshop, by Prof. Ayzin Küden, Dean of the Faculty of Agriculture and Prof. Alper Akinoglu, Rector.

Following the welcoming speeches, an overview of the EuroMedCitrusNet project was provided including its Partners, and objectives as well as its methodology and outputs. Participants were encouraged to participate in the project's activities including registering in the project's database, commenting on the project's deliverables, and participating in the formulation of and response to the Needs Assessment Survey. One of the EuroMedCitrusNet project outputs is an analysis of the Mediterranean citrus sector. This was presented at the workshop by Euroquality who is responsible for this task. The aim is to identify and review the major existing policies, support structures, regulations, and training in the field of citrus research to improve the quality and safety of citrus supply chains between Mediterranean Partner Countries and the EU. This information will be supplied in a series of reports from each of the countries comprising the EuroMedCitrusNet partnership that will identify the major public and private players in the knowledge network on citrus supply chains of the countries

involved. In addition, compilations of important issues relating to pests and plant selection issues as well as overall EU and Mediterranean Partner Country reports will be provided. The EuroMedCitrusNet Partners provided presentations summarizing the Sector Analyses for the countries France, Portugal, Greece, Turkey, Egypt, and Morocco at the workshop. In addition, the detailed National Sector Analysis reports will also be available soon on the project website.

In addition, to presentations by the EuroMedCitrusNet project partners, speakers were invited in order to link with other activities in citrus sector research and to provide information useful to the participants on citrus sector research to improve the quality and safety of citrus supply chains. Dr Anna Maria D'Onghia provided useful information on integrated pest management and a link with the MNCC network. Dr Samir Mili gave some economic perspectives influencing product quality and safety in food supply chains, in particular highlighting the importance of changes in consumer behaviour. The perspective of the processing industry was given through the presentation on Biohim, a citrus processing company from Greece. Information about the citrus sectors in Israel and the Turkish Republic of Northern Cyprus was provided by Avi Sadka and Abdullah Aktoprak respectively. Dr Androula Georgiu, from the Agricultural Research Institute, Nicosia, Cyprus was unable to attend due to a recent accident. Mr Benhaddou and Ozden Ozler provided information on citrus trading mechanisms in Morocco and Turkey respectively. Mr Ibrahim Tekin described the challenges of Turkish citrus producers in improving quality and safety and Dr Giogio Volpe presented the citrus research taking place at the University of Palermo. March, the EuroMedCitrusNet project Partners met for the first time at the Ipanema Hotel Porto to discuss citrus supply chain safety and quality of between Mediterranean Partner Countries and Europe.

EU - MEDITERRANEAN NETWORK OF KEY CITRUS STAKEHOLDERS

The EuroMedCitrusNet project aims to create a database of individuals and organisations relevant to the citrus sector to support research and development to improve the quality and safety of citrus supply chains between Mediterranean Partner Countries and the EU.

This database will allow members to identify partners in other regions or countries of the Mediterranean for establishing partnerships or developing project proposals. If you are conducting research related to improving quality and safety of citrus supply chains you are invited to enter your details. There is no charge for membership.

The database will contain citrus research organizations and companies including SMEs, business support organizations, and other organizations related to the safety and quality of citrus supply chains including training organizations.

Users can add research projects, which will be associated with their organisations. It will also include capabilities for the user to search for existing projects. All registrations will be validated by our team of experts as a means to ensure that users are provided with quality information.

As a registered user, in addition to information on the public website, you have full access to the following database services including:

- Search online database – Search for individuals or organisations through a series of criteria (e.g. Name, Research Interest, and Country).
- Update Personal Registration Details – Update information submitted under your registration such as contact details, areas of interest, projects, activities or facilities.
- Change Account Details Consult and update account settings (e.g. password and login settings).

Interested? Please follow the link and make your registration

http://www2.spi.pt/euromedcitrusnet/newuser1.as

FRUIT QUALITY CHARACTERIZATION OF SEVEN CLEMENTINE CULTIVARS. J. APPLIED HORTICULTURE (IN PRESS)

Chahidi, B., M. El-Otmani, F. Luro, I. Srairi, and M. Tijane. This paper presents work done by B. Chahidi in the Department of Horticulture, Institut Agronomique et Vétérinaire Hassan II, Complexe Horticole d'Agadir, BP 728, Agadir 80 000, Morocco in collaboration with F. Luro (INRA France) and I. Srairi (Domaines Abbès Kabbage/ Station Kabbage Souss).

Extended Abstract.

Morocco's annual citrus production is ~1.4 million tons, of which the group of easy-peeling mandarins, which is mainly made of various clementine cultivars (Citrus clementina Hort. Ex. Tan.), represents 30% of total production. Morocco is, thus, ranked as second largest producer of this specialty fruit behind Spain. Consumers of fresh fruit like to have a variety of fruit all year around. In terms of citrus, preference trends are for a seedless, orange-colored fruit, of medium size, with a balanced sugar/acid ratio, and with a relatively firm but easy-to-peel rind. Most of these characteristics are found in the clementine mandarin group (Hodgson, 1967; Saunt, 2000). This group is very diverse in terms of period of internal maturity, which starts in late September and extends to late January, but the majority of the production occurs in midseason (i.e. November-December) (Chapot, 1963; Devaux, 1981), and great efforts at the research level are continuously made in the main clementine-producing countries to find cultivars that mature much earlier (September-October) or much later (January-February) to extend the period of commercial supply (Agustí et al., 2002).

For a citrus grower to choose the right clementine cultivar for a given region or market, it is very important for them to know the characteristics of that cultivar particularly in terms of the development of its internal as well as external quality attributes. In particular, it is very important to know when the maturity index is attained, the rate of color change, sugar accumulation, acid dissipation, firmness loss, etc. In this research, we report the results obtained for several quality attributes (rind color, firmness, juice content, juice titratable acidity and soluble solids content) assessed on seven clementine cultivars sampled at different stages of maturity.

The experimental site is located in the Souss Valley of southern Morocco (Latitude 30° 20' N, Longitude 9° 22' W, Altitude 90 m) which has a semi-arid climate with rainfall of ~200 mm/year. Mature trees of seven clementine cultivars were included in the study, 'Caffin', 'Bruno', 'Nules', 'Esbal', 'Hernandina', 'Nour' and 'Guerdane', of which 'Caffin', 'Bruno', 'Nour' and 'Guerdane' are of Moroccan origin, and 'Guerdane' is the new mutation of clementine. The trees were budded on 'Carrizo' citrange rootstock. To assess fruit quality attributes, fruit were harvested at 2- to 3-week intervals, samples were collected at three to six

times during ripening (depending on the cultivar) to demonstrate the effect of harvest date on quality, starting on 20 October 2004, corresponding with the beginning of the maturity season, and ending on 25 January 2005, corresponding with the last harvest date of the lastest maturing cultivar. In the laboratory, the fruit were weighed and their average diameter measured. Fruit color index (CI) was determined using a CR300 Minolta chromameter following the method described by Jimenez-Cuesta et al. (1981). Parameters "L" (lightness), "a" (greenness to redness) and "b" (blueness to yellowness) were determined at two different spots around the equatorial zone of the fruit and sample averages were calculated. Rind firmness, as measured by puncture resistance force, was determined using a puncture gauge following the method described by El-Otmani and Coggins (1991). Fruit were cut along their equatorial zone, their juice extracted and weighed. Juice pH, titratable acidity (using 0.1 N NaOH titration), and soluble solids content (using a laboratory refractometer expressing the amount of sugars in ºBrix) were determined.

In summary, the results showed that all of the cultivars reached minimum maturity index (sugar / acid ratio greater than 7.0) by early November. The rate of rind color change is significantly influenced by picking period and is the main attribute that differs among most of the clementine cultivars (Fig. 1). In addition, 'Guerdane', a cultivar discovered in 1987 as a mutation in an orchard of 'Fina' clementine, is the only cultivar that matures much later (January-February) and has the characteristics of a late-maturing cultivar both externally as shown in Fig. 1 for rind color and internally as shown in Fig. 2 for rind firmness and in Fig. 3 for maturity index (ratio of total soluble solids/titratable acidity).

Literature cited

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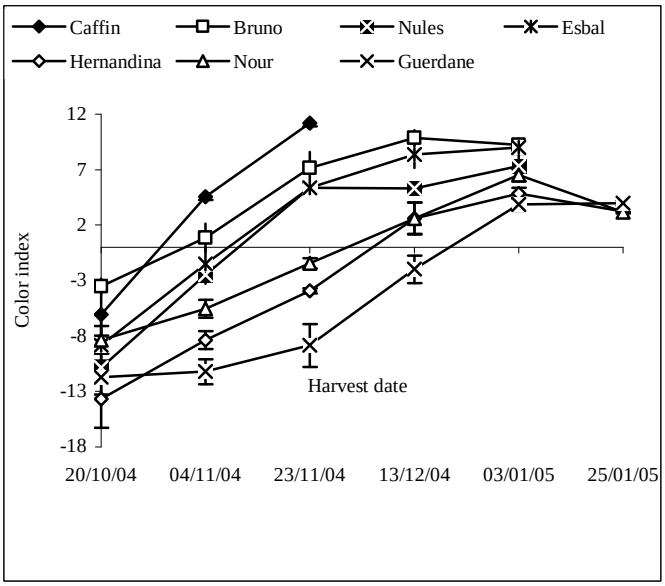

Figure 1. Time course of the fruit rind color index (CI) of 7 Clementine selections

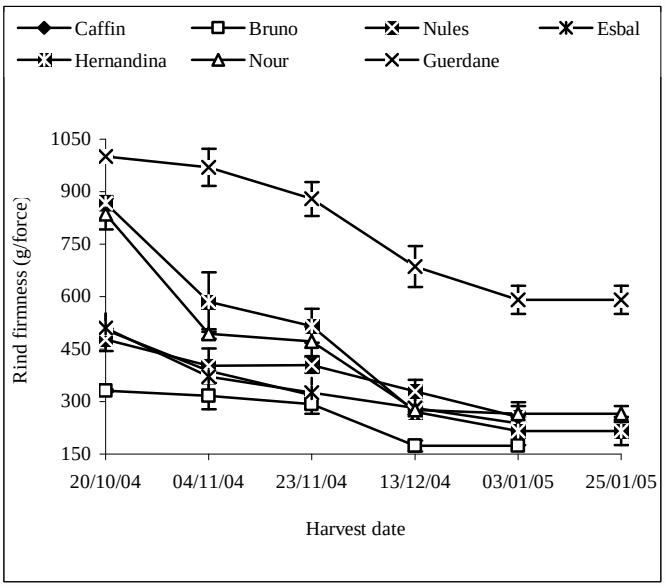

Figure 2. Time course of rind resistance to puncture for 7 Clementine selections

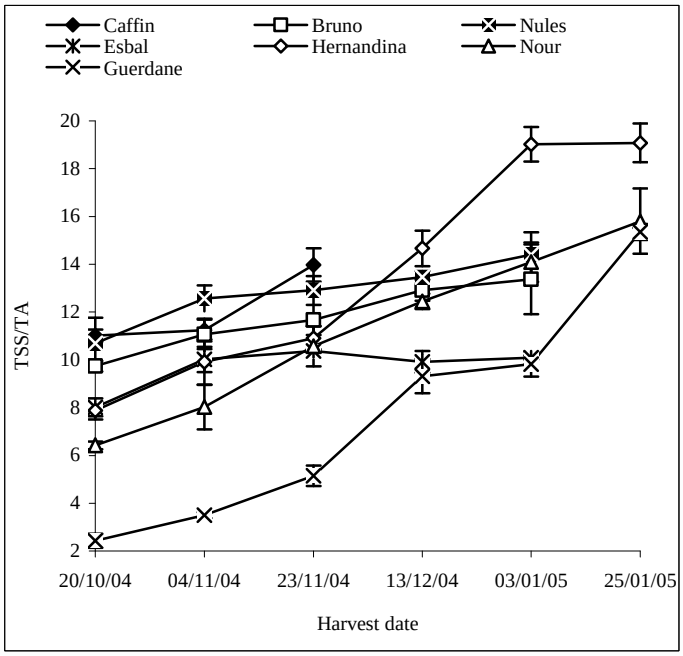

Figure 3. Seasonal variation of the maturity index (TSS/TA) in fruit juice of 7 Clementine selections

CREATION OF NEW ROOTSTOCKS AND IDENTIFICATION WITH THE USE OF MOLECULAR MARKERS

RESULTS FROM THE COLLABORATION OF GREECE-CYPRUS CITRUS RESEARCH INSTITUTES

We used the molecular marker class of amplified fragment length polymorphism (AFLP) in order to assess the genetic relations between fourteen species of citrus as well as their F1 progeny. Crosses were realized in the past by Dr Eftichios Protopapadakis and are maintained at the Institute of Subtropical plants and Olive in Chania, Greece (National Agricultural Research Foundation; NAGREF). In addition, we assessed the effectiveness of the AFLP markers in distinguishing nucellar from zygotic citrus siblings. For these studies we employed two primer combinations. In total, 97 scorable products were ampified of which 56 were polymorphic. Subsequently, individuals were clustered into two groups. For the first group Sour orange (Citrus aurantium) was used as a material plant for all the crosses. For the second group Sour orange (Citrus aurantium) was used as paternal plant while Citrumelo #1452 (Poncirus trifoliate X Citrus sinensis) and a local rootstock-which belongs to the group of Citrus limonomedica-served as maternal plants. To assess the genetic diversity within F1 we used nineteen individuals which were already identified as nucellar or zygotic on the basis of their morphological and isozymic characters. Overall, the classification based on the AFLP technique, is in good agreement with the initial classification based on morphological and isozymic characters. However, in nucellar seedlings, some AFLP loci were found, which did not originate from either parent. We propose then that they are the product of maternal genome recombination during nucellar embryogenesis. If this hypothesis is valid, then apomixis, in the citrus group, is another mechanism of creation de novo genetic variation. This de nove diversity may be responsible for the differences observed among nucellar seedlings. In addition, we also applied the MSAP analysis with the second group of our samples in order to determine patterns of genomic imprinting

OTHER EVENTS

15-17 October 2007

XV1th International Plant Protection Congress.

http://www.bcpc.org/IPPC2007/Exhibition/exhibition_home.asp

5-7 November 2007

International Organization for Biological Control of Noxious Animals and Plants (IOBC),

West Palaearctic Regional Section (WPRS)

University of Catania - Faculty of Agriculture

22-24 November 2007

5th International Congress of Mediterranean Group on Pesticide Research (MGPR),

Agadir, Morocco.

Contact: MGPR 2007 Secretariat, B.P: 1123 Agadir 80 000, Morocco.Tel: +21228241006/0155; Fax: +21228242243; Email: mgpr2007@gmail.com;

Website: www.mgpr2007.com

MGPR website http://mgpr.unica.it

6-10th May 2008

3rd European Whitefly Symposium, Aguadulce, Almeria, Spain

www.whitefly.org/EWSIII_2007/EWSIII.asp

contact Liz Robertson events@whitefly.org

24-29 August, 2008

The 9th International Congress of Plant Pathology (ICPP2008), Torino, Italy,

Contact: Prof. M.L. Gullino, University of Torino: marialodovica.gullino@unito.it

www.icpp2008.org

NEW PUBLICATIONS (2007)

See this link on CIRAD website:

http://agritrop.cirad.fr/lorisinternet/jsp/system/win_main.jsp?welcome_page=servlet%2FMenuManager%3Fmenu%3Dmenu_search

Title	Author	Where
Analysis of 13000 unique Citrus clusters associated with fruit quality, production and salinity tolerance	Terol Javier F.,Conesa Ana, Colmenero, Jose M., Cercos Manuel, Tadeo Francisco, Agusti Javier, Alos Enriqueta, Andres, Fernando, Soler Guillermo, Brumos Javier Iglesias Domingo, Götz Stefan, Legaz Francisco, Argout Xavier, Courtois Brigitte, Ollitrault Patrick, Dossat Carol, Wincker, Patrick, Morillon Raphaël, Talon Manuel	BMC Genomics = ISSN 1471-2164. - (2007)vol.8:n°31
Effect of harvesting date on fruit quality of grapefruit cv. Red Blush under Jordan Valley conditions	Muhtaseb, Jalal	Fruits = ISSN 0248-1294. - (2007)vol.62:n°2
Thermal degradation of antioxidant micronutrients in Citrus juice : Kinetics and newly formed compounds	Dhuique-Mayer, Claudie Tbatou, Manal Carail, Michel Caris-Veyrat, Catherine Dornier, Manuel Amiot, Marie Josèphe	Journal of agricultural and food chemistry = ISSN 0021-8561. - (2007)vol.55
2006-2007 citrus season forecasts : A record season	Imbert, Eric	Fruitrop = ISSN 1256-5458. - (2006)n°139

Other recent publications (2007)

Title	Author	Where
Evaluation of 'Hamlin' sweet orange + 'Montenegrina' mandarin somatic hybrid for tolerance to Xanthomonas axonopodis pv. citri and Xylella fastidiosa	Alexandra Pavan, Márcia Cristina Calixto, Suane Coutinho Cardoso, Beatriz Madalena Januzzi Mendes, Armando Bergamin Filho, João Roberto Spotti Lopes, Carlos Roberto de Carvalho and Francisco de Assis Alves Mourão Filho	Scientia Horticulturae, Volume 113, Issue 3, 20 July 2007, Pages 278-285
Irrigation management and rootstock effects on navel orange [Citrus sinensis (L.) Osbeck] fruit quality	M.T. Treeby, R.E. Henriod, K.B. Bevington, D.J. Milne and R. Storey	Agricultural Water Management, Volume 91, Issues 1-3, 16 July 2007, Pages 24-32
Orange (Citrus sinensis) juice concentration by reverse osmosis	D.F. Jesus, M.F. Leite, L.F.M. Silva, R.D. Modesta, V.M. Matta and L.M.C. Cabral	Journal of Food Engineering, Volume 81, Issue 2, July 2007, Pages 287-291

Title	Author	Where
Glutathione concentration and phytotoxicity after fumigation of lemons with methyl iodide	F.J. Ryan, J.G. Leesch, D.E. Palmquist and L.H. Aung	Postharvest Biology and Technology, Volume 45, Issue 1, July 2007, Pages 141-146
Scheduling deficit irrigation of citrus trees with maximum daily trunk shrinkage	J.E. Velez, D.S. Intrigliolo and J.R. Castel	Agricultural Water Management, Volume 90, Issue 3, 16 June 2007, Pages 197-204
Production of mandarin + pummelo somatic hybrid citrus rootstocks with potential for improved tolerance/resistance to sting nematode	Jude W. Grosser, J.L. Chandler and Larry W. Duncan	Scientia Horticulturae, Volume 113, Issue 1, 5 June 2007, Pages 33-36
Overexpression of citrus polygalacturonase-inhibiting protein in citrus black rot pathogen Alternaria citri	Hiroshi Katoh, Sarunya Nalumpang, Hiroyuki Yamamoto and Kazuya Akimitsu	Journal of Plant Physiology, Volume 164, Issue 5, 3 May 2007, Pages 527-535
Characterization of Citrus tristeza virus Isolates by Indicators and Molecular Biology Method	Yan ZHOU, Chang-yong ZHOU, Zhen SONG, Ke-hong LIU and Fang-yun YANG	Agricultural Sciences in China, Volume 6, Issue 5, May 2007, Pages 573-579
Effects of ultrasonic treatments in orange juice processing	M. Valero, N. Recrosio, D. Saura, N. Muñoz, N. Martí and V. Lizama	Journal of Food Engineering, Volume 80, Issue 2, May 2007, Pages 509-516
Preliminary assessment of the feasibility of using maximum daily trunk shrinkage for irrigation scheduling in lemon trees	Y. García-Orellana, M.C. Ruiz-Sánchez, J.J. Alarcón, W. Conejero, M.F. Ortuño, E. Nicolás and A. Torrecillas	Agricultural Water Management, Volume 89, Issues 1-2, 16 April 2007, Pages 167-171
Quality perceptions under evolving information conditions: Implications for diet, health and consumer satisfaction	Nigel D. Poole, Laura Martı´nez-Carrasco Martı´nez and Fernando Vidal Giménez	Food Policy, Volume 32, Issue 2, April 2007, Pages 175-188
Development of seedless and Mal Secco tolerant mutant lemons through budwood irradiation	O. Gulsen, A. Uzun, H. Pala, E. Canihos and G. Kafa	Scientia Horticulturae, Volume 112, Issue 2, 26 March 2007, Pages 184-190
The impact of water and agriculture policy scenarios on irrigated farming systems in Italy: An analysis based on farm level multi-attribute linear programming models	F. Bartolini, G.M. Bazzani, V. Gallerani, M. Raggi and D. Viaggi	Agricultural Systems, Volume 93, Issues 1-3, March 2007, Pages 90-114

Title	Author	Where
Farmers' costs of environmental regulation: Reducing the consumption of nitrogen in citrus farming	Andrés J. Picazo-Tadeo and Ernest Reig-Martínez	Economic Modelling, Volume 24, Issue 2, March 2007, Pages 312-328
Cyclosporin A inhibits calcium uptake by Citrus sinensis mitochondria	Halley Caixeta de Oliveira, Elzira Elisabeth Saviani, Jusceley Fátima Palamim de Oliveira and Ione Salgado	Plant Science, Volume 172, Issue 3, March 2007, Pages 665-670
Quality retention and potential shelf-life of fresh-cut lemons as affected by cut type and temperature	Francisco Artés-Hernández, Fernando Rivera-Cabrera and Adel A. Kader	Postharvest Biology and Technology, Volume 43, Issue 2, February 2007, Pages 245-254
Identification and evaluation of chloroplast uni- and trinucleotide sequence repeats in citrus	Ziniu Deng, Stefano La Malfa, Yuming Xie, Xingyao Xiong and Alessandra Gentile	Scientia Horticulturae, Volume 111, Issue 2, 4 January 2007, Pages 186-192
Effect of postharvest ethylene treatment on carotenoid accumulation and the expression of carotenoid biosynthetic genes in the flavedo of orange (Citrus sinensis L. Osbeck) fruit	Maria J. Rodrigo and Lorenzo Zacarias	Postharvest Biology and Technology, Volume 43, Issue 1, January 2007, Pages 14-22