

## POSTHARVEST TECHNOLOGY AND PHYSIOLOGY

Revision date: May 14, 2019

MODULE	CONTENT	YEAR	TERM	CREDITS	TYPE
Biology	Postharvest Technology and Physiology	3rd	2	6	Optional
<b>LECTURER(S)</b>			<b>Postal address, telephone nº, e-mail address</b>		
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<b>DEGREE WITHIN WHICH THE SUBJECT IS TAUGHT</b>			<b>OTHER POSSIBLE DEGREES</b>		
Degree in Science and Food Technology			Degrees in Biology, Pharmacy, Human Nutrition and Dietetics		
<b>PREREQUISITES and/or RECOMMENDATIONS (if necessary)</b>					
It is strongly recommended the student have completed Biology and Biochemistry and be able to translate a scientific journal paper.					
<b>BRIEF ACCOUNT OF THE SUBJECT PROGRAMME (ACCORDING TO THE DEGREE)</b>					
<ul style="list-style-type: none"> <li>Physiological processes in plant products after harvest. Optimization of conservation.</li> <li>Technology for the conservation of food of plant origin</li> </ul>					
<b>GENERAL AND PARTICULAR ABILITIES</b>					
General competencies: <ul style="list-style-type: none"> <li>CG1. Ability to communicate successfully in Spanish within the scope of the subject</li> <li>CG2. Problem-solving ability</li> <li>CG3. Teamwork</li> <li>CG4. Ability to apply theoretical knowledge in a particular way</li> <li>CG5. Decision making</li> <li>CG6. Ethical commitment</li> <li>CG7. Ability for analysis and synthesis</li> <li>CG8. Critical Thinking</li> <li>CG9. Concern for quality</li> </ul>					



- CG10. Ability for organization and planning
- CG11. Ability to manage information
- CG12. Be able to adapt to new situations
- CG13. Sensitivity to environmental issues
- CG14. Design and project management

Specific Competencies:

- CE1. Recognize and apply the physical, chemical, biochemical, biological, physiological, mathematical and statistical fundamentals necessary for the understanding and development of food science and technology.
- CE5. To know the processes of food preservation and identify the modifications they imply on food characteristics.

**OBJECTIVES (EXPRESSED IN TERMS OF EXPECTED RESULTS OF THE TEACHING PROGRAMME)**

- Provide Food Technology students with a solid background in the understanding of environmental factors affecting deterioration of fruits and vegetables
- Introduce students to technologies for conserving food of plant origin.
- To publicize the physiological processes of plants under adverse conditions caused by harvest and analyze their influence on the nutritional and commercial quality of food of plant origin.

**DETAILED SUBJECT SYLLABUS**

1. Concepts and objectives of the science and practice of post-harvest physiology.
2. Nature and structure of harvested products.
3. Metabolic processes in the harvested products.
4. Processes of secondary metabolism and products.
5. Development of plants and their parts.
6. Fruit set process.
7. Stress in the products harvested.
8. Gas and solute movements in harvested products and exchange with the environment.
9. Heat.
10. Post-harvest technology of fleshy fruits from temperate zones
11. Post-harvest technology of small fruits (grapes, strawberries, kiwis)
12. Post-harvest technology of subtropical fruits
13. Post-harvest vegetable technology
14. Post-harvest technology of flowers, leaves and stems
15. Post-harvest technology of underground organs (roots, tubers, bulbs)
16. Post-harvest technology of fruits and vegetables with low processing rates
17. Post-harvest technology of nuts

Lab classes:

1. Procedures in Post-Harvest Technology: Ethylene treatments. Influence of temperature on storage period. Influence of CO<sub>2</sub> in the storage period.
2. Evolution of starch and sugar content in fruits during ripening.
3. Evolution of respiration in fruits during ripening.
4. Changes in coloration of fruits during ripening. Measurement of photosynthetic pigments.
5. Evolution of pulp hardness during fruit ripening.



## READING

### BASIC READING:

- KAYS, S.J. (1991). Postharvest Physiology of Perishable Plant Products. Ed. Van Nostrand Reinhold.
- HERRERO A y J. GUARDIA (1992). Conservación de Frutos. Manual Técnico. Ed. Mundi Prensa
- WILLS, R.B.H. (1984) Fisiología y Manipulación de Frutas y Hortalizas Post-recolección., E.G. Hall, D. Gram. Ed. Acribia
- J.E. Taylor, G.A. Tucker (1993). Biochemistry of Fruit Ripening. Ed. Chapman Hall
- WILLS, R. (1999). Introducción a la Fisiología y Manipulación Poscosecha de Frutas y Hortalizas y Plantas Ornamentales. Ed. Acribia
- ADEL A. KADER (1992). Postharvest Technology of Horticultural Crops. Ed. University of California

### COMPLEMENTARY READING:

- TAIZ L. et al. (2015): Plant Physiology and Development (6th ed.). Sinauer Associates, Sunderland, MA, USA. Online contents: <http://6e.plantphys.net/>
- TAIZ, L. y ZEIGER, E. (2010). Plant Physiology (5ª Ed.). Sinauer Associates, Sunderland, MA, USA
- AMORÓS, A., P. ZAPATA, M.T. PRETEL, M.A. BOTELLA, y M. SERRANO. (2003) Physico-chemical and physiological changes during fruit development and ripening of five loquat (*Eriobotrya japonica* lindl.) cultivars. Food Science and Technology International, 9: 43-49.
- M.A. BOTELLA, F. DEL AMOR, A. AMORÓS, M. SERANO, V. MARTÍNEZ and A. CERDÁ. (2000). Polyamine, ethylene and other physical-chemical parameters in tomato (*Lycopersicon esculentum* mill. cv. daniela) fruits as affected by salinity. Physiologia Plantarum, 109: 428-434.
- Giovannoni, J. 2001. Molecular biology of fruit maturation and ripening. Annu. Rev. Plant Physiol. Mol. Biol., 52: 725-749.
- PRETEL, M.T., BOTELLA, M.A., ZAPATA, P.J., AMORÓS, A. AND SERRANO, M. (2004). Antioxidative activity and general fruit characteristics in different traditional orange (*Citrus sinensis* (L.) osbeck) varieties. European Food Research and Technology, 219: 474-478.
- SERRANO, M., M.T. PRETEL, M.A. BOTELLA, A. AMORÓS. (2001) Physicochemical changes during date ripening related to ethylene production. Food Science and Technology International, 7: 31-36.
- VALERO, D., MARTÍNEZ-ROMERO, D. AND SERRANO, M. (2002). The role of polyamines in the improvement of the shelf life of fruit. Trends in Food Science & Technology, 13: 228- 234.
- ZUZUNAGA, M., SERRANO, M., MARTÍNEZ-ROMERO, D., VALERO, D. and RIQUELME, F. (2001). Comparative study of two plum (*Prunus salicina*, Lindl) cultivars during growth and ripening. Food Science and Technology International, 7: 123-130.

## RECOMMENDED INTERNET LINKS

