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## PRIORITIES FOR POST-HARVEST RESEARCH IN THE CANARY ISLANDS

**A. Marrero**

Centro de Investigacion y Tecnologia  
Agraria (CITA), Tenerife, Spain

### THE AGRICULTURAL PRODUCTION OF THE CANARY ISLANDS

The Canary Islands are located between 27 and 30 degrees North latitude, some 200 km off the coast of Western Sahara. The agroclimate in the islands is defined by thermic regimes that range from semi-warm tropical to cool-maritime types, and humidity regimes varying between humid-mediterranean to semiarid-mediterranean, depending on the elevation above sea level and orientation (Hernandez Abreu, 1977). The main horticultural crops cultivated in the islands are summarized in Table 1.

**Table 1.** Surface and final value of the production for the main crops in the Canary Islands

Crop	Surface (Ha)	Value (million US\$ / year)
Grapes	12,304	25
Bananas	8,806	193
Other fruits	4,208	50
Potatoes	8,629	38
Tomatoes	4,377	171
Other vegetables	5,488	81
Ornamentals	477	55
Grains and legumes	3,115	3

Source: Sauret and Miranda 1993 (1992 data)

As it can be seen, the two main cash crops are bananas and tomatoes, jointly accounting for roughly 60% of the total value of the production. Grapes are mainly used for wine making and potatoes are destined to local consumption. In average, the ornamental plant and cut flower sector is the most productive, representing 9% of the final value with less than 1% of the cultivated surface.

Most of the production of bananas, other tropical fruits, tomatoes, winter vegetables, cult flowers and ornamental plants is transported to distant markets in mainland Spain or Northern Europe. For this reason, postharvest research for these commodities is of the utmost importance for the agricultural sector of the islands.

## PERSPECTIVES FOR CANARY ISLANDS AGRICULTURE

The recent incorporation of Spain to the European Union has brought about important changes in the agricultural activity of the islands. For some crops like banana, incorporation to the EU has meant the loss of the traditionally reserved Spanish market for canary production and competition with produce from "third" countries (Central America, Africa ...). This in turn has brought about the need for increased productivity and quality of our production.

The main problems concerning the improvement of the competitiveness of Canary horticultural products arise from the high cost of inputs (labour, water, ...), structural problems (small size and dispersion of plantations), poor selection and presentation practices and deficiencies in the marketing chain (packing, transport ...).

In the case of banana, important technological changes have been introduced in the past decade in order to improve the productivity of the crop. These changes include the use of more productive cultivars, the cultivation in greenhouses, the use of *in vitro* plant material and the increase in planting densities (Galan-Sauco et al, 1992, 1994). This increase in productivity should, however, be accompanied by a parallel improvement of the final quality of the product that reaches the consumers.

## OUTLINE OF RESEARCH PRIORITIES

Very little research has been performed in the Canary Islands in order to optimize the postharvest handling of the major horticultural exports. As it has already been mentioned, the current situation of market competition makes it a priority to develop a global strategy of quality improvement. There are some strategic advantages of Canary Islands' production that should be stressed in a coherent quality improvement plan. Among these, we can outline:

- Proximity to markets (compared to Central-American or African production)
- Possibility to optimize the organoleptic properties (flavour, aroma, texture) of the produce: due to both, the capacity to harvest at a fully mature stage and the subtropical nature of the production areas which, in turn cause a slower maturing rate of fruits
- No need for controlled-atmosphere storage or transport due to the short transit times
- Possibility for "biological" production because of the absence of major pests and diseases.
- High degree of technical equipment on farms which facilitates the adoption of new cultural practices.

The general goal would be to offer a differentiated product of the highest quality, a good visual presentation and excellent organoleptic properties, stressing when possible the environmentally-friendly nature of the production and the safety in terms of chemical residues of the final products. The main research activities, in order to attain this goal are:

- Assessment of new cultivars with improved with improved postharvest characteristics; resistance to mechanical damage during handling and to postharvest pathogens.
- Development of harvest indices to optimize the organoleptic qualities of the final product.
- Optimization of harvesting and packing techniques
- Development of non-chemical methods of postharvest-disease control
- Optimization of transport and ripening conditions

It is also interesting to develop a line of minimally-processed products for the part of the production that would not reach the maximum fresh quality standards.

### **A CASE EXAMPLE: RECENT CHANGES IN THE POST-HARVEST HANDLING OF BANANAS IN THE CANARY ISLANDS**

The banana sector is a prime example on how the integration in the EU has affected commercial postharvest practices in the islands. In the traditional handling system, whole banana bunches are cut off from the plants, wrapped in blankets and transported on shoulder to trucks. Wrapped bunches are stacked up to six layers high and transported to the packing station. There, bunches are unloaded by hand and dehanding while lying flat on tables or vertically on rotating stools. The individual hands are placed on transporting belts and drench-treated with a fungicide solution, before being classified and packed in 12-kg boxes. The boxes are typically stacked into pallets and transported to the harbour in open trucks without refrigeration, where they are loaded into refrigerated-bay boats.

The relatively rough handling and the lack of a refrigerated chain throughout the process causes a high incidence of bruises, cuts and premature ripening, which in turn affects the final appearance of the fruit. Recently, however, more and more farmers and packing stations are introducing improvements to the system in order to avoid those problems.

Evaluation of the postharvest behaviour of alternative banana cultivars is currently under way (Hernandez et al. 1993). Dehanding of banana bunches on the field and transport of hand to the packing station is also being experimentally tested. Many packing stations are being remodeled to reduce the possibilities of mechanical damage to the fruit.

In these new systems, bunches are transported in single layers in vertical position, individually protected with different wrapping materials. Unloading and dehanding of the bunches is done with the help of cranes so that the bunches are always suspended in the air. Washing tanks are being used in place of transporting belts for the cleaning, sorting and classification of the fruits. A proportion of the fruit is being packed in clusters in modified design boxes with better resistance and presentation, and pallets are immediately refrigerated in reefers at the packing stations. Thanks to these changes, the final quality of the fruit to the consumer has

substantially improved, but further research and development action should be taken in order to offer an appealing, competitive product in the European market.

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