CASE STUDIES

PREVENTION OF MUSCULOSKELETAL DISORDERS AMONG THE EMPLOYEES AT ALCOBAÇA APPLES AND OESTE ROCHA PEARS CULTIVATION

1. Organisations involved

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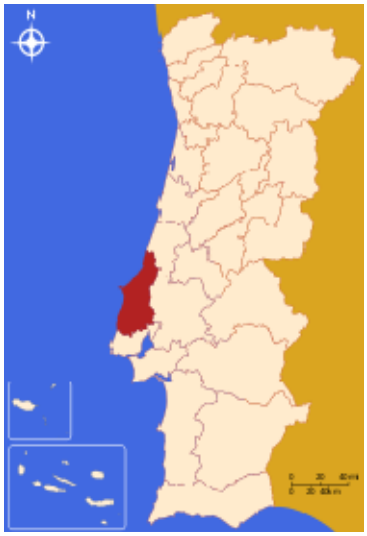
2. Description of the case

2.1. Introduction

Alcobaça apple (*Maçã de Alcobaça*) and *Oeste Rocha* pear (*Pêra Rocha do Oeste***)** are two important Portuguese fruits produced in the *Oeste* NUTS 3 sub-region.



The Oeste region and the symbols of *Pêra Rocha do Oeste and Maçã de Alcobaça*

Campotec SA (established in 1994) is producer's organisation with 90 employees and 705 ha of production. It receives the products from the gardens, controls their quality, packages and sells both products in the Portuguese and international markets. The company also advises, promotes good practices and controls the quality of the products at 104 associated producers. The company has a storage capacity of 4,500 ton and a total production capacity of 25,000 ton. The main

products are potato (37%), *Oeste Rocha* pear (19%), *Alcobaça* apple (13%), the brassica family of vegetables (13%) and horticultural products (13%). The objectives of the producer´s organisation are:

- to plan and concentrate the production;
- to support the producers;
- to store, prepare, package and market the production and;
- to develop new products, business and technical solutions that promotes the production.

Regarding the production of *Alcobaça* apple and *Oeste Rocha* pear, 30 associated farms produce respectively 3,300 and 4,800 tons of fruits per year. The farms have an average area of nearly 20-30 ha with 1-2 permanent workers, very often coincident with the owners. They perform activities like trimming the trees (December). Two temporary workers are contracted to weeding the soil (2-4 weeks of work at the end of May). 15-25 temporary workers are contracted yearly to collect the fruits between August and September.

5% of *Alcobaça* apple and 30% of *Oeste Rocha* pear are exported to Europe, mainly to England.

The farms have developed interesting technical solutions with the objective to increase the efficiency of the production, quality of the products, and safety and health of the employees.

2.2. Aims

A high productivity is crucial in the rural production in order to reduce exploitation costs and to increase the international competitiveness of the products. Both products (apples and pears) have to be carefully collected by hand in order to protect the fruits from internal and external defects. Traditionally the collecting of fruits was performed using mobile ladders (extension ladders and double sided step ladders). The efficiency of the collection process was very low and the risk to accidents and health problems to the workers was very high. Low back disorders and shoulder diseases were the most prevalent health problems related to the collection of fruits.

Simultaneously to increase the efficiency of the process, to increase the quality of the products and to reduce workload on the employees by simplifying the collection process were the main objectives to achieve by the producers.

2.3. What was done, and how?

Those farms with technical support from Campotec SA developed interesting solutions with the objective to increase the efficiency of the production, quality of the products, and safety and health of the employees. The solutions presented in the

next paragraphs are widely implemented in the *Oeste Rocha* pear and *Alcobaça* apple fruits collecting process.

The **first solution** presented is a **relatively low investment solution**, with some efficiency in the collection of fruits and in the transportation of fruits to the storage area. The weight handling in each movement by the employees is very low (2-4 fruits) and the trunk and shoulder postures are controlled by the two phases of collection: under and above shoulder level.

(1) The trees are aligned in one single plan, not traditionally in spherical arrangements. The height of the trees is controlled, planted far enough apart for a small tractor to move between them. As a result there is better use of transportation and less extreme movements (e.g. above shoulder level) need to be performed by worker to grasp the fruits from the trees.


Preparation of the land in a way that improves access by the transport

(2) Special mobile platforms are used to collect the apples and pears from the trees above shoulder level. Those platforms are attached and pulled by a tractor. They allow the workers to collect the fruits while standing safely in the mobile platforms. The mobile platforms avoid grasping above shoulder level and reduce the risk of accidents associated with the use of portable ladders.



Special mobile platforms to collect the apples and pears from the trees (avoid reaching above shoulder level)

(3) Manually pulled chariots equipped with normalized containers are used to store the fruits collected under shoulder level. The chariots are easily to pull by the employees.




Manually pulled chariots to store the fruits collected under shoulder level

(4) The design of the manually pulled chariots allows easily to unload the full containers and to load the empty containers. The manual effort during unloading and loading procedures is not relevant.

Procedures to unload and load the manually pulled chariots

(5) Open top containers are placed on the manually and tractor pulled platforms to collect the fruits (~300 kg / container). The containers are transported by tractors to the storage area of the farm.

Open top containers are used in the fruit collection process

(6) Portable electric scissors are used to trim the trees.

Portable electric scissors to trim the trees

The **second solution** presented is a **higher investment solution**, with high efficiency in the collection of fruits and in the transportation of fruits to the pallets. Also the trunk and shoulder postures of the employees during fruit collection are controlled by the height of the standing platforms and by the height of the fruits belt conveyors.

A semi-automatic processes to collect and transport the fruits to the pallets

2.4. What was achieved?

Increased efficiency of the collecting process, increased quality of the products (less surface and internal defects) and reduced workload on the employees were the main results achieved by the new collecting processes. Simplification and safety of the processes allowed temporary non-experienced employees, like young students and older employees to perform the job during the months of August and September with a very low risk to their health and safety.

2.5. Success factors

The international competitiveness in the rural products was the main factor that promoted the modification in the collecting process (from the ladders to the mobile platforms or to semi-automatic processes) as well as need to make the workplaces healthier and safer.

The experience and opinions of the workers together with the know-how of the farms' owners and support of Campotec SA managers were important success factors in the development of the mobile platforms and in the selection of the semi-automatic equipment.

The associated farms of Campotec SA are certified by GLOBALGAP (an internationally recognized set of farm standards dedicated to Good Agricultural Practices). In this sense the farms have to comply with the GLOBALGAP Risk Assessment on Social Practices (GRASP). The GLOBALGAP certificate is a reassurance that food has been produced respecting the health, safety and welfare of workers.

2.6. Further information

Further information may be obtained by contacting the organisation involved.

2.7. Transferability

The technical solutions presented in this case study are transferable to other fruit producing companies where the fruits have to be carefully collected by hand, and the trees may grow aligned in one single plan and controlled in the height.

3. References, resources:

Campotec SA
http://www.swork.biz/unirocha/portal/index.php?id=1123
Unirocha.Com
http://www.unirocha.com/
APMA-Associação de Produtores de Maçã de Alcobaça
http://www.macadealcobaca.pt/new/apma.asp
ANP - Associação Nacional de Produtores de Pera Rocha
http://www.perarocha.pt/