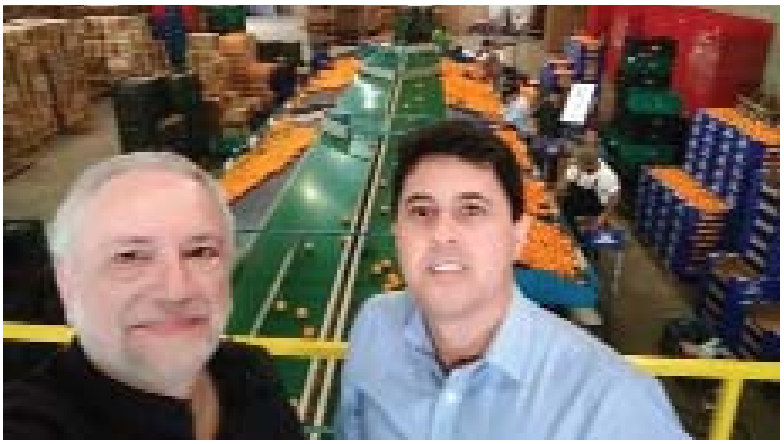
Ozone, degreening and pressurization New technologies for the citrus sector

The latest technologies applied to production processes have hugely helped in the improvement of the value chain of agricultural products, offering solutions that increase their profitability. This time, we are presenting some industrial refrigeration methods and machinery, especially for post-harvest treatment and pre-cold handling, ripening, degreening in pressurized tunnels (controllable from a PC or smartphone), as well as for controlled and intermediate atmospheres.

These techniques and some others are being applied by the Argentinian company Orlando Refrigeration, which is dedicated to industrial refrigeration and was founded in 1932 by the grandfather of Engineer Alfredo Orlando. Since 1996, they have been working together with the Dutch VDH, but also with other companies in the Netherlands, Chile, Peru, etc., always trying to help producers obtain the best quality fruit during the export season.

For its part, VDH is a Dutch company that is dedicated to the manufacture of electronic controllers for many industries. It is also devoted to the design and enforcement of specific controls for refrigeration, ripening and fruit degreening. One of these controls is called PROBA 5, which allows to regulate the entire degreening and ripening process in their stores.



Some processes need to be kept under control

These processes are very meticulous and involve regulating temperatures cold and hot, gas concentration of ethylene and CO2, controlling these two gases is essential to achieve a good degreening or maturing , humidity, variable ventilation and pressure, gas extraction in accordance with the requirements of its customers. Eliminating green mold (Penicillium digitatum) and blue mold (Penicillium italicum) - Blue mold

One of the systems that is being used to ensure that citrus fruits are kept in perfect condition entails the application of ozone. Its microbicidal action acts on the citrus, improving the fruit's permeability and stopping infecting agents.

It also eliminates the ethylene gas C2H4 degrading, this gas is the cause of the deterioration of the fruit. Ozone is fast and effective in the elimination of bacteria, viruses, fungi and spores. It has a deodorizing action, tackling the cause of the problems without adding any other smells. Also, its oxygenating action contributes to improving the efficiency of the cells of organisms by stimulating several enzymes involved in these processes.

Alfredo Orlando has also explained what citrus degreening actually entails. It is "a process that is similar to that of ripening. The temperature is altered and gases are injected; in this way, we ensure that the color is always the right one for the product's sale, preventing any green traces. These traces are, in fact, chlorophyl, which transforms over time into other substances, such as carotenes, etc., and whose transformation is accelerated by the process of degreening. This makes it easier to obtain an even-colored fruit by the time it needs to be exported."

According to Orlando, "degreening in citrus fruits is done for merely aesthetic reasons, since the products' flavor and texture are already suitable for consumption, despite the appearance of those green traces. The degreening is done in the warehouse, just before the fruit's preparation for shipment to the markets, and is necessary only during the first months of the harvest, since the process is later carried out naturally by the plants."