



CHERRIES: FARMERS REDUCE CHEMICALS

While Improving Irrigation Efficiency with Nanobubble Technology

Client Case Study: Avium Research Center

Location:	Unit:	Date:	Soil:	Results:
Avium Research Center, Curico, Chile	NEO 250 with Onboard Oxygen	2022 / 2023	15%-25% Clay	<ul style="list-style-type: none"> • Estimated savings of 20-25% water use • 70.4 % increase in dissolved oxygen • Reduced biofilm and clogging, reducing costs on chemicals • Estimated ROI of 6-12 months

Avium Research Center Trial

During the 2022-2023 season, a trial with Moleaer's technology was carried out in Curico, the most important area for cherry cultivation in Chile.

Avium Research Center, led by Agricultural Engineers Carlos Tapia and Emilio Martínez, two of the most recognized experts in cherry cultivation internationally, carried out the study. The cultivation of cherry trees in Chile has experienced constant growth in recent decades, consolidating as one of the fundamental pillars of the country's fruit industry. The importance of cherry tree cultivation in Chile is not limited only to the national context but is also projected on a global scale due to the growing demand for this fruit in international markets.

Technology has played a crucial role in the evolution of cherry cultivation, and nanobubble technology has captured the attention of the agricultural community to optimize resources, improve water quality, increase productivity, and enhance fruit quality.

Moleaer's Neo 250 unit with onboard oxygen generator was installed to treat the irrigation water, while another area was irrigated with non-treated water as the control. Pressure and flow measurements were made for each treatment to determine the volume of water replacement.

Proven Results With Moleaer Nanobubbles

Water treated with Moleaer's nanobubble technology increased the level of dissolved oxygen by an average of 70.4% throughout the trial.

The section irrigated with nanobubbles-enriched water registered significant water savings, while all vegetative, quality, and production parameters remained consistent. The levels of nutrient reserves increased, a critical metric

for cherry trees, confirmed by foliar analysis showing an increase in total Nitrogen, Arginine and proteins. Similar results were found in a trial in [cucumber](#) where a higher concentration of nitrogen and potassium was also found in the fruit. Many other scientific studies have also shown similar results, resulting in water and fertilizer savings.

In cherries, increased reserve levels enable a higher activity in spring sprouting processes and a higher fruit quality. The researchers also reported a positive trend in bud fertility rates.

Researchers estimated nanobubble technology saved 20-25% in irrigation water usage during optimal irrigation conditions. This is consistent with results from similar trials on corn and lettuce and several [papers](#) where the effect of nanobubbles on water efficiency and [biofilm control](#) has been highlighted.



Figure 1: Comparison of sediments in irrigation water
T0 = Control, T1 = Treatment with nanobubbles

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When the irrigation lines were cleaned, there was a significant difference in the sediment concentration in the water between the treatment with nanobubbles and the control, measured in transparent millimeter vessels (Figure 1). The water treated with Moleaer nanobubbles showed a significantly lower concentration of suspended solids.

Biofilm and suspended solids cause clogging of the drippers, which directly affects the uniformity of the irrigation. This has a direct correlation with uniformity in root and plant development, and therefore, in uniformity of production throughout the orchard.

Reduced clogging allows growers to reduce the use of chemicals and labor for cleaning drip lines and replacing emitters. Based on these results, it's estimated that only considering potential cost savings from biofilm control, the return of investment would be between 6 to 12 months. With the importance of cherry crops in Chile agriculture, nanobubble technology is helping growers save on water and chemicals while improving crop quality.



Moleaer nanobubble generator, Neo 250

Benefits of Nanobubble-Enriched Water

As cherry orchards reach their adult stage, it is essential to ensure an adequate supply of oxygen to the root system, which has a direct impact on the trees' health and yield. Moleaer's patented nanobubble technology is proven to transfer oxygen into water with over 85% efficiency, enabling growers to achieve increased and stable dissolved oxygen (DO) concentrations to promote better root development and reduce pathogens and algae.

Moleaer's technology also generates trillions of stable, oxygen nanobubbles with unique properties that provide additional benefits, such as better water infiltration in the soil and compaction reduction, favoring more efficient water and nutrient absorption.

What Are Nanobubbles and How Do They Work?

Nanobubbles measure between 70 and 120 nanometers in diameter, approximately 2500 times smaller than a grain of salt, which gives them unique physical and chemical properties different from microbubbles and other larger bubbles.

Thanks to their neutral buoyancy, they move randomly and continuously through the water at all points of an irrigation system using a Brownian movement. Nanobubbles help reduce soil compaction through increased soil flocculation.

Their negative charge and hard surface help to clean the biofilm from the irrigation lines, reducing obstructions and improving the distribution uniformity of irrigation.

High concentrations of negatively charged nanobubbles reduce the surface tension of water and improve the infiltration of soils as well as improve the capillary action of dissolved nutrients to get nutrients and water to the root zone where they are needed most. Better capillary root mass results in more efficient nutrient uptake.



To Learn More About How Irrigation Water Infused with Nanobubbles Helps to Improve Soil Health And Structure, Download Our Ebook:

www.moleaer.com/soil-ebook

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