Photoselective Mesh Invention Helps Preserve Crops

University of Concepcion

During the last decade, farmers have suffered extreme meteorological phenomena that have deteriorated crop production and intensified water shortages. Examples include the 120-degree days recorded in Oregon and Washington in 2021 hitting vineyards; and the case of an apple field in southern Chile that lost 40% of their production due to sunburn.

In 2000, researcher and agronomist Richard Bastías from the University of Concepcion in Concepción, Chile, saw the effects of climate change were increasing the temperature, solar radiation exposure, and periods of drought in the fields. These extreme environmental conditions were causing a decrease in fruit sizes, water deficit, and loss of production due to sunburn. Bastías' laboratory decided to investigate the use of meshes to protect the fruit from solar radiation without affecting the trees' productivity. Their research culminated in 2015 with a novel combined photoselective netting helping to overcome these crucial global challenges.

> *Presently, farmers in Mexico, Peru, and Chile are applying this innovation in commercial apple, cherry, and blueberry orchards, where it is promoting vegetative, floral, and fruit growth. These meshes have improved production and water efficiency by guaranteeing favorable environmental conditions such as reduced direct sunlight radiation and less extreme temperatures.*

These conditions avoid anthocyanin degradation, stimulate chlorophyll synthesis, reduce overexposure to summer solar stress, and improve water usage efficiency by limiting water evaporation.

Normally, sunburn loss in fruit affects over 40% of production. The application of these meshes reduced these losses between 60-95%, depending on the species. In berries, there has been an increase in yield per plant, improved fruit quality (volume, weight, color), more flower blooming, and improvements in post-harvest processing.

Finally, the use of these meshes accounts for 50% less water usage compared to other nets. One of our early adopters said, "the mesh allows to increase the productivity of the fields while extending their usable lifetime. Also, it allows us to reduce the use of water, a scarce resource." Convinced of the value of this technology, Campomallas licensed the technology, with forecasts of over $25 million in sales over the next three years, which would make it the most profitable invention of the University of Concepción.

The tech transfer process is highly collaborative. The Technology Transfer Office (TTO) was important to articulating the key actors in the development process, particularly; Sandra Araya's leadership as Director of UdeC TTO. In addition, the specialized support provided by APTA, particularly Varinka Farren's drive as APTA's CEO, made it possible to exhibit the technology with international partners, proving its use at a global scale, demonstrating that Chilean science can have an impact on the global market. The technology is undergoing patent applications in the United States, Europe, Mexico, Peru, and Chile, and is entering the Peru and US markets.

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