

Perfecting A Cost-Saving Methodology

A Wisconsin-based manufacturer has spent the last decade developing and trying to perfect a methodology for producing a certain product at a significantly lower cost.



Before a potato hits the dinner plate, it may have taken six to eight years of development to get there.

Among the thousands of varieties of potatoes, characteristics like size, color, solid-matter content, and starch type can all vary, and they are appealing to producers and consumers for their respective characteristics. For instance, some varieties are more desirable for the production of French fries or potato chips, while other varieties are best served baked or mashed at dinner. It can take decades to bring a new variety of potato to the consumer market. In fact, it can take five to seven years just to produce the amount of seed needed for a potato farmer to grow his crop to support a commercial demand.

Quantum Tubers Corporation, based in Delavan, Wisconsin, has spent a decade developing a methodology for creating minitubers for seed potatoes that can be produced with drastically shortened propagation times and, consequently, lower production costs. Quantum Tubers' patented technology was developed in conjunction with NASA, and also the University of Wisconsin's Plant Pathology Department, utilizing their greenhouse and Biotron facilities to provide isolation and controlled atmosphere conditions for growing minitubers. This research resulted in a methodology that produces viable minitubers as a pathogen-free seed source year round in an intensive culture of high-density sterile stem-cuttings in a soilless media.

Perfecting A Cost-Saving Methodology

Published on Industrial Maintenance & Plant Operation (<http://www.impomag.com>)

Instead of spending years propagating seed potatoes that will be susceptible to degradation and pathogens (due to tubers being repeatedly recycled for seed), with this methodology, a new variety of seed potato can be ready for the commercial market in as little as two years. The minitubers are planted in open field conditions to directly propagate pathogen-controlled seed stock tubers, effectively skipping several generations of costly field multiplications. The Quantum Tubers technology is designed for industrial capacity in large-scale commercial production using a proprietary system of biomanufacturing.

The use of minitubers is not new to the potato industry; however, minitubers have traditionally been very expensive to produce and companies have not been able to produce the quantities needed for viable commercial market demand. To address this, Quantum Tubers developed its own proprietary automated commercial propagation system for the production of pathogen-free, nuclear stock minitubers. In this system, minitubers are harvested in 40 to 50 days depending upon variety and size requirements making it possible to harvest up to 9 crops per year. Following harvest, all tuber production is placed in induced dormancy in cold storage for future seed stock to be used by seed producers. What makes a commercial biomanufacturing system from Quantum Tubers so appealing is the very short generation period for the tubers. "It normally takes up to 160 days to grow a potato plant. We can now do this in as little as 50 days," says Bob Britt, President and CEO of Quantum Tubers.

But achieving such short production periods requires the growth conditions to be extremely precise. Factors like humidity, light, temperature, and length of the day all have to be measured and monitored. To do this, Quantum Tubers has incorporated advanced technology and components into their commercial biomanufacturing systems.

Britt had been using a flow sensor to detect the amount of liquid nutrients being applied to the plants during production, but it was failing to provide the data accuracy that he was trying to achieve. After consulting with Larry Jacob of MTECH Wisconsin, Inc., a TURCK Inc. representative, Britt learned that TURCK's digital read out (DRO) flow sensor could be used to detect the liquid nutrients much more accurately than the technology Quantum Tubers had in place. The DRO flow sensor was connected to the water supply that fed into the chambers, and the sensor proved especially useful when it detected that a solenoid switch had broken down and was draining the supply tanks.

Britt also discovered (with the help of Jacob) how other TURCK products could help Quantum Tubers improve the processes involved in the commercial propagation system. Over the next two years, Jacob helped Britt design and implement a system specific to Quantum Tubers' commercial biomanufacturing needs. This system included the use of TURCK's modular BL67 remote I/O system, with analog input modules that obtained measurements from humidity, temperature, light, CO₂, and the TURCK flow sensors. Also contained in the BL67 system are digital output modules controlling fluid valve solenoids for CO₂, humidity, and for adding liquids to the chambers used in the spray system.

“Working with Turck saved us at least a year of development time,” notes Britt.

The BL67 system is also used to control light banks, circulating fans and the cooling circuit within the propagation system. This is accomplished using both 4-point output modules and 16-point output modules connected to a RELECO by TURCK relay panel specifically designed and built for Quantum Tubers. The relay panel uses both standard C10 relays for fans and the unique C10-A15X electronic lighting ballast relay capable of 125A for 20m/second to handle the special demands of their lighting banks.

“Before using Turck products, we had a series of breakers in a 5 by 2 [foot] panel chock-full of electrical equipment, and electrical fires were not uncommon because of proximity to wet conditions,” adds Britt. “Unlike BL67, the system we had before was difficult to work with and almost impossible to make any changes.”

Another feature of the system that appealed to Britt is the IP 67 rating carried by the BL67 system and many other TURCK products. This allows their placement in the washdown environment that occurs in a Quantum Tubers commercial propagation system.

“TURCK has been helpful in making sure we have the right components for our system and being there to help us iron out all problems,” Britt said.

Quantum Tubers also implemented quick-disconnect cables from TURCK to transfer data from the sensors to the BL67 system. This included Ethernet cables, conduit adapters, power cabling and field wireables for fan connections, along with an IP 67 rated power supply and associated cabling.

“Implementing this system saved us six months of hands on time putting the system into a big box,” Britt adds. “The best part about the system is that it can easily be put into the hands of a third party for installation, and they will be able to implement it quite easily.”

This factor is particularly useful in countries that have no seed potato producers and are forced to import potato seed that may contain disease from other countries. For example, if a country in Africa purchases seed that contains brown rot from another country, it can devastate their crop and severely cripple that nation’s potato supply. In these situations, a country can use Quantum Tubers’ commercial biomanufacturing system to locally produce a potato variety that’s tailored to its particular growing region, while ensuring that the tubers are pathogen-free — and at the same time, getting new potato products to the market at a much faster rate.

Britt said TURCK’s solution helped the company solve a significant development problem for controlling its proprietary biomanufacturing system.

“Without the personalized help that Larry Jacob and his MTECH Wisconsin/TURCK team provided, we would have lost countless hours of development time — and we would not have the bullet-proof, customized controls system that we enjoy on our

Perfecting A Cost-Saving Methodology

Published on Industrial Maintenance & Plant Operation (<http://www.impomag.com>)

technology today," Britt said.

For more information, please visit www.turck.us [1] and www.quantumtubers.com [2].

Source URL (retrieved on 12/21/2014 - 4:34pm):

<http://www.impomag.com/articles/2010/11/perfecting-cost-saving-methodology>

Links:

[1] <http://www.turck.us/>

[2] <http://www.quantumtubers.com/>