fresh CUT

UVC Emitters™ Help Eliminate Mold, Extend Shelf-Life at Martin Farms

Maintaining a clean indoor environment – whether to satisfy HACCP guidelines or to optimize product shelf life – is a concern of every produce grower and packer. John B. Martin and Sons Farms, Inc. of Brockport, N.Y. is no exception.

"We wanted to find a way to reduce mold counts in the room where we process butternut squash, but our facility did not lend itself to a true clean room environment," states Peter Martin, production manager for Martin Farms.

"Instead, we have had excellent success using a surprisingly simple solution: We pressurized the space and installed ultraviolet-C (UVC) lights manufactured by Steril-Aire, Inc. to function as an air cleaning mechanism. Our mold counts have dropped dramatically, our air quality has improved and our shelf-life has increased dramatically as a result."

Before arriving at this solution, Martin Farms was experiencing high mold and yeast counts, based on weekly product sampling performed by Primus Labs. This task was part of the company hazard analysis critical control point (HACCP) program. Yeast occurs naturally in the squash itself but can multiply to undesirable levels if ambient conditions allow. High levels of yeast can also promote mold proliferation and can actually mask the presence of mold spores, a problem that sometimes occurred in the butternut squash processing room.

High Counts Confirmed

High mold and yeast counts from puree test samples were confirmed when a technical consultant, FP Technologies, Inc. of N. Tonawanda, N.Y., performed both air sampling and swipe (surface) sampling in the process area. Both types of samples showed very high counts of airborne and surface mold spores and yeast: about 20,000+ colony-forming units (CFUs) per cubic meter of air.

"We suspected the cause to be cross-contamination from the far end of the building where we produce raw cabbage product," states Martin.

Working with FP Technologies, Martin learned of a new generation of devices that use ultraviolet-C energy to eradicate both surface and airborne mold and bacterial contamination. The UVC wavelength targets the DNA of microorganisms. This causes cell death and makes replication impossible. The new-generation devices are designed to produce optimum energy output in cold and moving air environments. This makes them ideally suited to food and beverage processing lines, cold storage areas, air conditioning systems and similar applications.

A research study, conducted by the University of Tulsa in a 286,000-square-foot building, found that Steril-Aire UVC light fixtures installed in the air-handling units were effective in reducing mold contamination by as much as 99 percent. Based on research results and positive experiences of other users, Martin thought the technology was worth a try.

The Solution

The main component of the new system is a 3,000-cubic-feet-per-minute, make-up air unit that serves to pressurize the 800-square-foot room where butternut squash is peeled, de-seeded, cubed or halved and tray-wrapped in preparation for retail distribution under the Golden Acres label. Two commercial-style UVC light fixtures with 24-inch long tubes are installed inside this air-handling unit.

Product shelf life has doubled as a result of Martin Farms' efforts.

The lights operate round-the-clock to eradicate any airborne microbes that may pass through the system – including mold, bacteria, viruses and other contaminants. The UVC energy emitted by the lights provide safe, continuous, non-chemical cleaning, keeping the inside air fresh and preventing cross-contamination from other areas.

Martin Farms operates this line on a seasonal basis from September to Easter. It is now in its third year of using UVC lights.

"During the production season, we run the lights 24-hours-a-day. Based on that schedule, we get two seasons' use from the lights. When we replaced the

Emitter tubes after the second season, it was as easy as changing light bulbs. The devices have not required any other maintenance," says Martin.

The Results

Since the system started operating, FP Technologies has performed periodic air and surface sampling tests to monitor results. Mold and yeast have dropped from the previous level of 20,000+ CFUs per cubic meter of air to a range of 1,800 – 2,200 CFUs – an approximate tenfold reduction. Tests on product samples reveal similar reductions.

Martin Farms' butternut squash processing line is equipped with Steril-Aire UVC light.

Before Martin Farms instituted a HACCP program in this area of the facility, shelf-life of the butternut squash was typically just under one week. "We increased shelf-life to 10 days once the HACCP program was in place," says Martin. "Then, after pressurizing the room and installing the UVC lights, we experienced another big improvement: We now average up to two weeks for shelf-life."

Martin continues: "This doubling of product life gives us a great deal of flexibility. And since we now have more time for shipping, we've been able to expand our geographical marketing area. We're pleased with how the UVC devices are working, and we're investigating additional uses for the product," he notes.

Martin Farms officials plan to install additional lights in the HVAC system, opposite the cooling coils, to improve air quality over the coils and eliminate the organic buildup that naturally occurs on coil surfaces.

"UVC in this application will not only keep the air cleaner but will also improve the operating efficiency of the HVAC system," says Martin. He has learned from Steril-Aire that UVC coil-cleaning applications yield a very rapid payback because of the resulting savings in energy consumption. He is also evaluating UVC for upper-air application in cold storage areas and for potential use over conveyor lines.

Martin's Goals

"Our goal is to achieve the best possible product quality with the longest possible shelf life," says Martin. "To attain this goal, we use a complex equation that includes not only UVC but also a good HACCP program, sound management practices in the plant, good refrigeration after processing and much more. UVC has definitely improved the equation," he says. ■

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