

Disinfection of Produce Using a Webmaster Industrial Controller by Mike Price

Ready-to-eat produce is growing in popularity across the globe. Any water that comes in contact with the produce must be carefully treated and monitored since the produce is typically ingested without any further sanitation. There have been a number of instances over the last five years where illness has been caused by improper disinfection of water used to irrigate, process, or wash the produce. Most people can recall the episodes with spinach, tomatoes, lettuce, peppers and a number of instances with meat products. Although this article will deal primarily with fruits and vegetables, similar systems can be used in meat processing and sanitization in food plants.

Fruits and vegetables can be contaminated during a number of events along the way from the field to delivery to a store. The first area of concern is irrigation of the fields. Leafy vegetables are more susceptible than other types of vegetables due to the folds in the leaves that can harbor bacteria. If bacteria are present in the irrigation water, it can accumulate in these folds during spray irrigation. To eliminate this potential source of contamination, it's important to utilize an oxidant to control bacterial levels in the flumes and in the irrigation water. Achieving reliable control is possible through the automation of chemical addition and the monitoring of oxidant levels to ensure proper residuals and contact times are maintained in the washing flumes. The oxidants that are typically used in these applications are chlorine dioxide, ozone, peracetic acid, or sodium hypochlorite.

Many fruit and vegetable processing plants utilize recirculating flumes. This makes it easier to maintain residual levels and contact time of the oxidant since changes are more gradual and the system allows for mixing of the chemical and water. Monitoring and control of the oxidant is achieved by controlling the chemical feed rate based on the sensor readings. The sensor can be ORP (Oxidation Reduction Potential), which is not based on a particular chemical, or an ion selective sensor such as free chlorine, peracetic acid, chlorine dioxide or ozone. Ion selective sensors typically have membranes that can be fouled by dirt and debris. The use of a probe wash assembly extends the time between membrane cleaning. The pH should also be controlled, especially when free chlorine is used as the oxidant since pH will affect the relative percentages of hypochlorous acid and hypochlorite ion.

Disinfection by definition assumes a level of liability. To reduce liability it's important to monitor and maintain data associated with the disinfection system. When the process parameters are out-of-range, the system must alarm so that rapid corrections can be made or the process can be shut down.

A simple way to control and maintain visibility to the process is with the use of a WIND Industrial Controller. This controller integrates sensors, control, data logging, and remote communications in a NEMA 4X waterproof enclosure. Direct sensor inputs are available for ORP, pH, free chlorine, chlorine dioxide, peracetic acid, and ozone. Relay outputs control chemical pumps, valves or other devices in the system. Any other important

parameter can be integrated, such as temperature, flow, feed verification (to ensure the chemical pumps are functioning properly), ultrasonic level (on the chemical tanks) and possibly turbidity to indicate when the water should be changed. All of these parameters can be monitored and controlled through the digital and analog inputs available in the WIND Controller.

Remote access to the WIND Controller is easily accomplished over a LAN, phone line, or cell modem connection. Onboard diagnostics and graphing capability are useful for troubleshooting and determining the root cause to a particular problem. If a process is out of control, alarm messages can be displayed locally and can be sent by email or cell phone text message.

A leading manufacturer of systems for disinfection in the fresh cut fruit and vegetable industry is Pulse Instruments in Van Nuys, California. They have utilized their customized WIND controller in numerous plants throughout the US and Mexico. Karan Khurana, the owner of Pulse Instruments said, "WIND controllers allowed us to integrate several individual processes, that were previously fragmented. Interdependent functions could utilize interlocks for improved performance. Built in data recording and communications create helpful diagnostics, and essential trace-back records".

As regulations become more stringent and liability increases, automated control, data logging, and remote communications will become the deciding factors in best available technology (BAT) and a mitigating factor in liability as well as a method for producing safe and healthy products.

Typical Vegetable Washing Installation

