Photo by Gerald Holmes

(Left) A sanitizer's effectiveness is greatly reduced by the presence of accumulated soil and organic matter in the wash water.

Photo by Gerald Holmes

(Right) Rhizopus spores grow on a decaying sweet potato. Because this fungus can produce millions of spores on a single rotting root, roots should not be allowed to remain on the packinghouse floor from one day to the next.

The proper curing, storage and handling of sweet potatoes are the first steps in the management of post-harvest diseases.

The importance of packinghouse sanitation should not be overlooked, however. Most post-harvest decay is the direct result of poor sanitation, especially when combined with poor handling practices that result in injuries to the sweet potatoes. Decay-causing microorganisms are continuously being introduced into the packinghouse on materials brought in from the field. These organisms can survive for long periods on contaminated surfaces.

Sanitation

Sanitation refers to the procedures used to reduce the numbers of decay-causing microorganisms to levels that do not pose a significant threat. This includes the treatment of wash water (both in the dump tank and elsewhere along the packing line), the various components of the packing line, storage bins and other surfaces within the packinghouse where decay-causing organisms can survive. Sanitation is most effective when the surfaces to be sanitized have been cleaned to remove adhering debris and bacterial films. The general rule of thumb is to rinse, wash, rinse and then sanitize.

Sanitizing Agents

A variety of chemical sanitizing agents are available for use in packinghouses. Many of these may be used only to sanitize environmental surfaces and are not labeled for use on the food crops themselves. Those that may be used in wash water that comes in contact with food crops include chlorine (available as liquid chlorine, chlorine gas and sodium hypochlorite), chlorine dioxide, hydrogen dioxide and peroxyacetic acid.

Chlorine is the most commonly used sanitizing agent, but its effectiveness is highly dependent on the pH of the water and the amount of organic matter and soil present on the sweet potato roots and in the water. The concentration of free (not total) chlorine should be monitored periodically and kept within the range of 100 to 150 parts per million. The optimal pH for the most efficient sanitizing is within the range of 6.5 to 7.5. At higher pH levels (greater than 8), most of the chlorine will be present as the hypochlorite ion, which is the least effective form of chlorine. Under these conditions, greater concentrations of free chlorine are required for the same sanitizing effect. At lower pH levels (less than 6), the solution becomes much more corrosive to equipment, and chlorine gas forms and volatilizes away, reducing the free chlorine concentration. Chlorine is a strong oxidizer that reacts readily with organic matter present in the wash water. The presence of large amounts of organic matter greatly reduces its effectiveness as a sanitizer.

Peroxyacetic acid, which also is a strong oxidizer, is a viable alternative to chlorine for use as a sanitizer. It is less corrosive to equipment and more stable in water containing organic matter than chlorine. Concentrated peroxyacetic acid is highly toxic and must be handled with care, however. The efficiency of peroxyacetic acid as a sanitizer also is affected by pH, and it is much more effective at a pH of 7 or less.

General Recommendations

Fresh sanitizing solutions should be prepared every day. For sanitizing wash water in packinghouses, it generally is recommended that free chlorine levels be kept within the range of 100 to 150 parts per million and that the pH of the water be kept within the range of 6.5 to 7.5. The wash water should be replaced as often as possible during the day or at least when it becomes obviously dirty. Storage bins and packing line components should be cleaned and sanitized after each use. Sweet potatoes and debris should be removed from the packinghouse floor daily.