

Department of Food Science

Food Safety

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The Questions on Salvaging Flooded Crops

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Due to the recent flooding of areas of North Carolina which grow underground crops such as peanuts and sweet potatoes, questions arise as to whether the crops are salvageable. Many of the crops will spoil in the fields because wet soils will interfere with harvest. For any salvaged produce there is the potential for contamination with human pathogens, as well as the issue of chemical contamination. Generally, public health regulations prevent the human use of any produce salvaged from grocery stores and other facilities which has been contacted by flood waters.

Assessing the safety

There are several questions that need to be answered in order to assess the safety of flood-covered underground crops. The most obvious is “What was in the flood waters?” “Flood waters” are different from standing waters. Standing waters are not an unusual occurrence after a heavy rain. The present concern is for flood waters which may be grossly contaminated with agricultural runoff such as biosolids from farms, septic systems, lagoons and treatment facilities, and possibly, chemical contaminants from damaged and destroyed equipment and tanks. Certainly, any rising, standing or receding water is suspect if its origin is other than local rainfall.

To assess the danger of waterborne contaminants, all these contaminants would have to be identified and then the uptake of contaminants in the crop would need to be measured. However, this is difficult to assess in the field. Due to their considerable dilution with fresh rain water, some scientists have noted that flood waters may not be concentrated sources of pesticides and other environmental contaminants. Certainly, in areas with localized environmental disasters, such as

sewage overflow, chemical spills or other catastrophes, exposure of crops is more critical.

Why can't we recondition the crops?

The second question is, “Is there a way to recondition these crops?” Recent increases in diseases from fruits and vegetables have come from the application of wastewater, and improperly composted manures to soils. Flood conditions in some areas may mimic these hazards. Root crops harvested in these soils may be contaminated. The Food and Agriculture Organization of the United Nations recommends that heavily contaminated fruits and vegetables should receive a thorough potable water wash prior to washing in a disinfectant. However, this may not be applicable to the current situation in North Carolina.

Washing the produce

When washing, produce should be washed with water that contains a free chlorine residual at all times. The primary purpose of chlorinating wash water is to prevent microbial buildup in the processing waters from becoming another source of contamination. Without the chlorine residual in wash water we can expect microbial growth which will increase microbial contamination on the surfaces of produce. This wash does not disinfect the produce.

Disinfection

How about attempting to disinfect the produce itself? Using 100-200 ppm chlorine in wash waters is a common practice. However, the literature shows that such levels of disinfectants are not found to be effective in destroying human pathogens on produce. The organic matter present on the surface of the produce decreases the effectiveness of chlorine. At best, studies

show that microbial populations can be reduced only 1-2 log cycles. Produce that is mishandled and recontaminated will soon return to prewash levels or higher levels of microorganisms. Sometimes destruction of the existing mixed flora present on produce surfaces may actually result in reestablishment of a more concentrated flora of human pathogens.

Further processing

The fourth question is, "What if we process further?" Further processing is an important contributor to the safety of food processed. Products such as sweet potatoes are peeled. Some, like peanuts, are removed from the pod. Cooking destroys most pathogens. Processing certainly reduces the microbial load, and may reduce some of the surface chemical contamination. Because of the uncertainty as to the type and extent of the contaminants, this further processing does not necessarily provide an assurance of safety.

Applicable laws

Federal food laws are more applicable to products after harvesting than before. The Food, Drug and Cosmetic Act section 402(g)(4) prohibits preparing, packing, or holding human food under insanitary conditions where it may have become contaminated with filth or where it may have been rendered injurious to health. Under regulations contained in 21 CFR 110.110,

evidence indicating that presence of insanitary conditions deems the food to be adulterated. This is the case even if the amounts of natural or unavoidable defects are less than the established levels. Just the condition deems it adulterated. Root crops under contaminated flood waters can be assumed to be in insanitary conditions.

Market considerations

Aside from the safety aspects, marketing considerations are also an issue. The quality of the produce will be reduced by extended submersion. Early spoilage will probably be a factor in marketability. North Carolina works hard to sustain and enhance its markets. Irreparable damage could occur to these markets, not only by shipping a potentially contaminated product, but by shipping a product perceived by consumers to be suspect.

Priority: Food safety

Because contaminated flood waters present both microbial and chemical hazards which cannot be effectively controlled, foods which have contacted them should not be used for human food. Safety cannot be tested or adequately assured. This approach is a conservative one, but it is a sound one consistent with the principles found in current good agricultural practices. The safety of the food supply must take priority over other competing issues in this situation.