



Worthwhile Operational Guidelines & Suggestions

BROILER PROCESSING TIMELY INFORMATION - MAY 2003

IRRADIATION PASTEURIZATION

Irradiation, or treatment of foods with radiation, is a long-studied and reliable process to enhance the quality of perishable food products. Three sources of radiation are currently approved in the US: radioactive isotopes (cobalt-60 and cesium-137), x-rays, and electron beams. Radioactive isotopes decay continuously, but produce deep penetrating gamma rays. X-rays (photon energy) can be produced as a focused beam with a penetrating energy similar to gamma rays. Electron beams (electrons) have low penetration power, typically more suited for single layers (<3.6 inches) of packaged material (hamburger patties or tray-pack meats) exposed from both sides. Both x-rays and the electron beams have the advantage of being turned on and off by a switch. Radiation doses are measured by calorimetry (amount of rise temperature due to exposure for a given time). A Gray (Gy) equals 1 Joule/kg, and 1 kGy is about 0.4 BTU/lb. Low doses (< 1kGy) of irradiation can be used to inhibit potatoes from sprouting, prevent fruit from ripening, and to destroy mold on fruit. Doses from 1-10 kGy are used to destroy pathogens on meat and poultry. Doses >10 kGy can be used to sterilize spices and dehydrated vegetables. Sterilization doses can cause off-flavors in some foods, but are only used for extended shelf-stability under special circumstances (i.e., food products destined for the military and the space program). Most fresh and frozen foods are exposed to lower doses (pasteurization) to kill pathogens. All foods pasteurized by irradiation must be labeled with radura, an international symbol (above) to inform the consumer. Fresh and frozen poultry products can be irradiated with up to 3 kGy to reduce bacterial pathogens, as approved by the FDA (1990) and USDA (1992). Food irradiators must operate under their own HACCP plan to control dose, exposure time and product temperature. Given the proven effectiveness against food borne pathogens and growing consumer confidence, irradiation of meat and poultry products is likely to increase dramatically in the coming years.



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