Food irradiation is finally a commercial possibility

Dr. John Cox, a laser physicist pioneering in the use of x-rays for food irradiation, is interviewed by Marjorie Mazel Hecht, managing editor of Fusion *magazine.*

Fish that stays fresh in the refrigerator for two or three weeks, pork that is trichina free, strawberries that don't go bad, potatoes that don't sprout, and grains that don't get mealy—this is the promise of food irradiation that can now be delivered.

Forty years of research have demonstrated that food irradiation is an effective and wholesome means of disinfesting foods and prolonging their shelf life. Finally, in April 1986, after five years of investigation, the U.S. Food and Drug Administration issued a regulation permitting low dose (100 kilorad) irradiation of fruits and vegetables, and thus allowing U.S. consumers to reap the benefits of this technology. The FDA also issued a regulation permitting low-level irradiation of fresh pork, thus making possible the elimination of trichina.

Now, the go-ahead is expected soon for high-dose sterilization of foods. Radiation sterilization, the same processs that is used to prepare the food the astronauts eat in space, allows food to be kept indefinitely without freezing or refrigeration. This means that in years when harvests are bountiful, produce can be harvested, bagged, and irradiated to keep indefinitely without refrigeration. How does it taste when used much later on? The astronauts will tell you that it's fine. In the developing sector, food sterilization would make it possible for the processing of available crops and meats and their storage at one-fourth the cost of canning.

Twenty-eight countries now have approved the use of food irradiation for 40 different food products. In fact, the United States, which has pioneered the technology, actually lags behind the rest of the world in commercialization. Also, internationally accepted food irradiation standards permit 10 times the amount of irradiation permitted by the FDA-adopted regulation.

Most of the food irradiation plants now operating use cobalt-60 as their source of irradiation. The ionizing energy from the decaying radioactive cobalt source sends very short wavelength gamma rays into the food or produce being ionized. The gamma rays penetrate inside solid particles and kill microorganisms by breaking down the cell walls or destroying the metabolic pathways of the organism so that the cell dies. At higher doses, all microorganisms are killed, sterilizing the processed food.

There is no radioactivity induced in the processed food. The chemical reaction caused by the gamma rays does not involve the atomic nuclei of the food, and therefore the atomic structure of the molecules is not changed.

Irradiation facilities for processing food or medical supplies are not elaborate. There is a radiation source with its shielding, a conveyor system that transports tne produce to and from the source, and various control systems to manage the processing, and storage facilities. Usually the cobalt-60 is embedded in pencil-thin rods, which are then submerged in a well of water that serves as a shield. The dose of radiation received depends on the time of exposure and on the product's distance from the source.

Another method that has been researched but not yet commercialized is using accelerated electrons as the source of ionizing energy.