

Food Irradiation *Myth of the Month* (April 2014)

Myth:

“E-Beam Irradiators are faster than Gamma Irradiators.”

Reality:

This statement is incorrect. Processing speed is based on the designed production throughput for an irradiator independent of whether it is E-Beam or Gamma.

There is a fundamental difference of how the radiation is delivered between e-beam irradiation and gamma irradiation. E-Beam irradiators expose a relatively small mass of product for a relatively short period of time. In contrast, gamma irradiators expose a relatively large mass of product for a relatively long period of time. Typically, the “dose rate” for electrons is much greater compared to that of gamma but the amount of product exposed during irradiation is much greater in a gamma irradiator than in an e-beam irradiator.

This myth was created by only looking at the “dose rate” aspect of productivity and not at the mass of the product being irradiated. For example, using the same product/dose in an e-beam and gamma irradiator of similar production throughput, one could say that the e-beam irradiator irradiates a product in seconds whereas a gamma irradiator takes minutes. This would support the myth.

What was left out of the preceding example was that the e-beam irradiator was only irradiating a box of product in seconds, whereas the gamma irradiator was irradiating a pallet of product in minutes. This breaks the myth.

The “speed” of an irradiator is really its production throughput whether it is e-beam or gamma. Or, on average, how many pounds an hour the unit can produce. Not how many seconds it takes one box to run through the unit.

Technically, the real production rate of an irradiator (speed) is measured in (dose x mass)/time. For example: kGy-kilograms/hour. Both e-beam and gamma irradiators can be designed for any production rate. Like all processing equipment, the design parameters are defined to meet market conditions...fast enough to meet demand at the appropriate cost.