



factsheet

## Irradiation as a Phytosanitary Treatment

Globalized trade, global warming and mass tourism contribute to the spread of invasive species, in particular insects. According to a study published in Nature in 2016, the damage that invasive insects cause by spreading diseases, consuming crops, altering ecosystems and damaging infrastructure is at minimum USD 70 billion annually.





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## The Use of Irradiation as a Phytosanitary Treatment

Before a fresh product can be imported, national biosecurity agencies may impose post-harvest quarantine measures that include chemical treatments (for example methyl bromide fumigation), heat treatments (forced air, steam or hot water dipping), cold treatments (long storage at low temperature), and increasingly irradiation.

The use of irradiation as a phytosanitary treatment has been pioneered in Hawaii for the shipment of produce such as papaya or sweet potatoes to the continental U.S. While the U.S. Department of Agriculture Agency for Plant and Inspection Service (USDA-APHIS) has played an essential role in the development of phytosanitary irradiation (PI), the broad international recognition of the method came in 2003 when the International Plant Protection Convention (IPPC) published the Guidelines for the Use of Irradiation as a Phytosanitary Measure (ISPM No. 18).

PI generally requires low doses of a few hundred grays that have no or minimal sensory or nutritional impact on the treated product, making the technique applicable to a very broad range of commodities. Unlike other phytosanitary treatments, PI does not necessarily aim at outright mortality but also at preventing the successful development of the life stages or the inability to reproduce. The acceptance of live but non-viable pests during the inspection process is a paradigm shift for inspectors.

## Alternative Treatments

Whereas development of heat and cold treatments involves generating data for each fruit host and pest combination, irradiation treatments are developed for a pest species irrespective of fruit host. This concept of generic doses is possible because most commodities can tolerate irradiation at doses that kill the pest, whereas developing heat and cold treatments involves a compromise between killing the pest and minimizing adverse effects on the produce being treated.

## Global Trade

As of 2016, the global trade of fresh produce irradiated as a phytosanitary measure had grown 10-fold in ten years and involved more than a dozen countries, with Mexico and Australia as the largest exporters and USA and New Zealand as the leading importers. The number of irradiation facilities dedicated to PI is steadily increasing.

## Trends

Enough commercial experience has now been gained to confirm the efficacy and utility of PI, which is based on compliance with a whole process rather than only on a final inspection. Recent research now aims at integrating PI technology into individual packing houses. This solution would allow full control by the packer and would minimize the time between harvest, packing, irradiation, and shipment, while containing costs and minimizing losses.