Irradiation for the Management of Post Harvest Diseases

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Abstract—*In the tropics, physical agents like irradiations and heat treatments have been observed to provide appreciable protection against the microbial pathogens causing post harvest diseases of fruits and vegetables. Under suitable conditions, radiation may reduce populations of, or eliminate microbial pathogens and retard physiological processes such as ripening or senescence and sprouting. The radiation systems though expensive, may be integrated with other storage and handling methods. Gamma rays (Cobalt-60 or Cesium-137), fast electrons (linear accelerators), and ultraviolet light (UV) have been used as radiation sources. UV light has been employed to treat several fruits and vegetables as a disease management strategy (Narayanaswamy, 2008). A range of UV-C doses was tested on gerbera flowers to activate germicidal and inducible defense mechanisms. Irradiation of Botrytis cinerea cultures with 0.5, 1.0, 2.5 and 5.0 KJ/m^2 UV-C resulted in up to a 10-fold reduction of conidial germination and significant delay of mycelia growth, compared to non-irradiated control cultures. Moreover, polyphenol oxidase (PPO) activity was increased and remained higher compared to the non-irradiated control flowers throughout (48 h) storage period at 20˚C. Increase of PPO suggests that this enzyme might play an important role in host defense mechanisms that suppressed B. cinerea floret specking (Anastasios et al., 2012). The influence of gamma irradiation in the antioxidant potential of chestnut fruits and skins were studied. The bioactive compounds (phenolics and flavonoids) and DPPH (2,2-diphenyl-1-picrylhydrazyl) radical-scavenging activity, reducing power and inhibition of Beta-carotene bleaching capacity were determined. Irradiation of fruits at dose of 1.5 and 3.5 kGy decreased significantly the total fungal counts compared with non-irradiated (Amilcar et al., 2011). After 28 days of storage at refrigeration temperature, the non-irradiated fruits were contaminated with high concentrations of mycotoxins as compared to irradiated 3.5 kGy samples. Mycotoxin production in fruits decreased with increasing irradiation dose and were not detected at 5.0 kGy (Nagy and Loutfy, 2002).*