Detection of Inorganic Insecticides and Fertilizers in Organic Peach Fruit

S. Arnone[1], L. Bontempo[2], F. Camin[2], M. Cristofaro[1], R. Gatti[1], R. Mandatori[3], M. Perini[2], P. Rapisarda[4], R. Tabilio[3], C. Tronci[5], & G. Zappa[1]

Keywords: organic fruit, residual pesticide, bioindicator, fertilizer, bioelements, IRMS

Abstract

The absence of inorganic pesticides and fertilizers in fruits must be guaranteed for certification of organic products. Two experimental strategies have been set up in order to implement traceability at market level of organic fruit. One considers the potential of fruit fly (Ceratitis capitata L.) as a bioindicator of the presence of insecticide residues in peach fruit and the other checks if isotopic ratios of bioelements (carbon, oxygen, hydrogen, nitrogen) change depending on the different fertilization systems.

Preliminary dosimetric tests on fruit fly have been carried out to assess the threshold of sublethal and acute doses of ®Spinosad GF-120, ®Decis-Jet, and ®Confidor. During the 2006 and 2007 seasons, growing fruits of two peach cultivars were individually isolated by using paper bags and sprayed at 3 weeks, 2 weeks, and 1 week from harvest with ®Spinosad GF-120, ®Decis-Jet, and ®Confidor 200SL. Harvested treated and untreated fruits have been used to carry out two laboratory bioassays. Single fruits were exposed to oviposing females in order to determine adult mortality, oviposition, and larval development. A second trial was set up by using fruit extracts (skin, skin and flesh) with fertile eggs: egg hatching and larval survival and activity were considered as parameters. HPLC analysis were performed on fruit treated with ®Confidor 200SL to relate the imidacloprid residual amount with insect behavior.

About 24 samples of peach fruit, cropped with synthetic and different doses of organic fertilizers, were collected during the 2005 and 2006 seasons. The samples were subjected to the measurement of the ratios 18O/16O of juice water, 13C/12C, 15N/14N and D/H of pulp by Isotopic Ratio Mass Spectrometry (IRMS). The data obtained were evaluated by the different fertilization systems.

[1] ENEA BAS-BIOTEC, Rome, Italy
[2] ISMAA, S. Michele all'Adige (TN), Italy
[3] CRA-ISF, Rome, Italy
[4] CRA-ACM, Catania, Italy
[5] BBCA, Rome Italy