Evaluation of pesticide residues in fruits and vegetables from the Aegean region of Turkey and assessment of risk to consumers

Didem Kazar Soydan, Nalan Turgut, Melis Yalçın, Cafer Turgut and Perihan Binnur Kurt Karakuş

Environmental Science and Pollution Research 28: 27511–27519. (2021)

Abstract

Pesticides may cause a potential risk to human health when applied in excess to control pests, diseases, and weeds in crop fields. In the current study, conducted in the Aegean region of Turkey from 2012 to 2016, a total of 3044 samples of 16 different commodities of fruits and vegetables were screened to identify pesticide residues and health risk to consumers posed by such residues was assessed. Results showed that 354 samples out of the total samples had higher maximum residue limit (MRL) values, while the MRL values were lower in 473 samples. In the study, residues of 64 different pesticides detected in 3044 samples in which 11.6% samples exceeded maximum residue limit (MRL) levels as compared with that of the approved MRL level by the Turkish authorities. Out of total samples, number of samples having high MRL level were as follows: 74 for chlorpyrifos (2.43%), 145 for azoxystrobin (3.8%), 112 for triadimenol (3.8%), 103 for carbendazim (3.4%), 98 for chlorpyrifos (3.2%), 94 for pyrimethanil (3.10%), 90 for cyprodinil (2.9%), 76 for fludioxonil (2.50%), 75 for indoxacarb (2.40%), 66 for imidacloprid (2.10%), and 60 for boscalid (1.90%). Residues of one, two, three, four, and even more than five pesticides were detected, respectively, in 16.1, 5.8, 2.8, 1, and 1.7% of the total test samples. The lowest estimated daily intake (EDI) values ranged from 3.57×10^{-3} to 8.98. The lower values of hazard quotient (HQ) were obtained in dried apricot, grape, and strawberry with the value of 0.01, although the HQ value in 32 out of 62 pesticides tested was found to be close to 0.