Evaluation of Risk to Consumers from Exposure to Pesticide Residues on Fresh Food Commodities for the California Pesticide Residue Monitoring Program

Puttappa Dodmane; Andrew Rubin; Qiaoxiang Dong; Leona Scanlan; Peter Lohstroh; Maxwell Leung; Carolyn Lewis; Svetlana Koshlukova; Michelle Armstrong; Shelley DuTeaux; MaryLou Verder-Carlos
Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, CA

In order to limit public exposure to illegal pesticide residues in food, the California Department of Pesticide Regulation (DPR) operates the California Pesticide Residue Monitoring Program (CPRMP). This joint enforcement and human health assessment program monitors and assesses the health implications of pesticide residues in raw agricultural commodities. Commodities may be sampled at any point in the channels of trade, including wholesale and retail outlets, distribution centers, and farmer's markets. CPRMP is designed to enforce pesticide tolerances established by the US Environmental Protection Agency (US EPA). Tolerances, defined as the highest residue levels of a pesticide legally permitted on a specific commodity, are based on field trials and risks to human health posed by the pesticide. Once collected, the samples are quantitatively analyzed for approximately 400 different pesticides. Two types of violations are monitored by CPRMP: 1) "over tolerance" (OT), which occur when residue levels are greater than the tolerance limit; and 2) "no tolerance established" (NTE), which occur when a tolerance has not been set for the pesticide on a specific commodity. In both cases, CPRMP immediately investigates and quarantines the affected produce and conducts health risk evaluations to inform and protect the public. The health evaluation is limited to acute dietary exposure, as chronic consumption of the same lot of fresh food is deemed unlikely. The risk evaluation is conducted by first estimating levels of pesticide exposure through diet using commodity consumption rates established by the National Health and Nutrition Examination Survey (2003-2014) data, then by comparing that exposure to acute oral reference doses (aRfDs). aRfDs are maximum acceptable oral doses established by DPR and US EPA (and, when necessary, the European Food Safety Authority and the World Health Organization). Exposures greater than the aRfD indicate potential acute health risks to consumers and trigger more stringent enforcement actions than those undertaken when a health risk is not indicated. If sampled commodities contain residues from multiple pesticides known to belong to a common mechanism group, a hazard index approach is used to calculate combined risk. We present several recent evaluations of illegal residue detections highlighting the diversity of case types encountered in CPRMP, including those containing single or multiple pesticide residues.