DIETARY RISK ASSESSMENT OF PESTICIDE RESIDUES IN BANANAS

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Abstract

Bananas produced for the international trade are the among the most pesticide-intensive food crops. The aim of this research was to determine the residual levels of pesticides in bananas, to assess the acute exposure from pesticide residues in bananas and to determine the acute risk to consumers.

In this work, eight pesticides: azinphos-ethyl, carbofuran, chlorfenvinphos, chlorpyriphos, metazachlor, methoxychlor, propham and sulfotep were analyzed in 10 banana samples taken from the market of Bosnia and Herzegovina. Analyses were carried out by the QuEChERS approach, using gas chromatography with mass spectrometry detection (GC-MS). To determine the risk, acute exposure assessment was performed according on International Estimation of Short Term Intake (IESTI) equation. In acute quantitative risk assessment, estimated dietary exposure was compared with the relevant toxicological reference values Acute Reference Dose (ARfD).

In four banana samples the levels of pesticide residues were below detectable limit, in five samples determined levels of pesticide residues were at or below the maximum residue level (MRL), while in one sample level of pesticide residue exceeded MRL. Carbofuran was detected in three samples (concentration range 0.01 - 0.03 mg/kg), chlorpyriphos in five samples (concentration range 0.01 - 0.17 mg/kg), propham in two samples (concentration range 0.01 - 0.02 mg/kg) and methazachlor in one sample at 0.01 mg/kg. For one banana sample where the level of carbofuran residue of 0.03 mg/kg was found above MRL (0.01 mg/kg), acute exposure risk assessment was performed and there was a risk for health, because the calculated dietary intake was above the ARfD.

Risk assessment has established that the intake of certain pesticide residues from bananas in acute exposure conditions is not within the limits of the reference toxicological values. Dietary intake of bananas may pose an acute risk to adults and children, especially if consumed in large quantities.

***Key words**: Bananas, Pesticide residues, Dietary risk assessment.*