Cumulative risk assessment of the intake of organophosphorus and carbamate pesticides in the Danish diet

The aim of the study is to evaluate the potential cumulative effects of organophosphorus and carbamate pesticides that act through a common mechanism of toxicity, and to assess the long- and short-term risks for the Danish population. The intake estimates are based on dietary intake data collected in the Danish nation-wide food consumption survey in 1995. The pesticide data are based on the Danish pesticide residue-monitoring programme from 1996-2001. The amount of 35 organophosphorus pesticides and carbamates were included in the cumulative risk assessment. Processing factors, such as reduction of pesticide levels by rinsing and peeling, were applied in the exposure assessment. The "Toxicity Equivalence Factor" (TEF) approach was used to normalise the toxicity of the different organophosphorus and carbamate pesticides. Cumulative chronic exposure of organophosphorus and carbamates pesticides via fruit, vegetables and cereals is for adults 0.8-2% of the Acceptable Daily Intake (ADI) in chlorpyrifos equivalents, and 0.03-11% of the ADI in methamidophos equivalents; and for children 2-5% of the ADI in the chlorpyrifos equivalents, and 0.07-27% of the ADI in methamidophos equivalents. Neither Acute Reference Dose (ARfD) nor ADI was exceeded for any of the compounds studied. The results indicate that the Danish population is neither exposed to any cumulative chronic risk, nor at risk of acute exposure, from consumption of organophosphorus and carbamate pesticides from fruit, vegetables and cereals.

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