Health impact and damage cost assessment of pesticides in Europe

Health impacts from pesticide use are of continuous concern in the European population, requiring a constant evaluation of European pesticide policy. However, health impacts have never been quantified accounting for specific crops contributing differently to overall human exposure as well as accounting for individual substances showing distinct environmental behavior and toxicity. We quantify health impacts and related damage costs from exposure to 133 pesticides applied in 24 European countries in 2003 adding up to almost 50% of the total pesticide mass applied in that year. Only 13 substances applied to 3 crop classes (grapes/vines, fruit trees, vegetables) contribute to 90% of the overall health impacts of about 2000 disability-adjusted life years in Europe per year corresponding to annual damage costs of 78 million Euro. Considering uncertainties along the full impact pathway mainly attributable to non-cancer dose–response relationships and residues in treated crops, we obtain an average burden of lifetime lost per person of 2.6 hours (95% confidence interval between 22 seconds and 45.3 days) or costs per person over lifetime of 12 Euro (95% confidence interval between 0.03 Euro and 5142 Euro), respectively. 33 of the 133 assessed substances accounting for 20% of health impacts in 2003 are now banned from the European market according to current legislation. The main limitation in assessing human health impacts from pesticides is related to the lack of systematic application data for all used substances. Since health impacts can be substantially influenced by the choice of pesticides, the need for more information about substance application becomes evident. © 2012 Elsevier Ltd. All rights reserved.