

# **OCCUPATIONAL RISK ASSESSMENT TO PESTICIDES: A TOOL INTO THE REGULATORY PROCESS**

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Access to a safe and affordable food supply should be a fundamental goal for all cultures, societies and governments. Challenges that currently prevent achieving this goal are significant and are expected to increase in the future. Long-term trends such as a growing world population and changing dietary habits are generating higher demands for food and feed products. Climate and weather yield losses, increased input costs for energy and fertilizers, and higher demands for alternative bio-fuel based energy sources create additional challenges.

The U.S. Census Bureau (June, 2009) estimates that the world population will increase by 50% in the next 40 years. The resulting increase in food demand coupled with a limited supply of arable land will require significant improvements in agricultural production efficiency. Pesticides have played a key role in advancing agricultural productivity over the past 50 years and there is little doubt that their continued use will be necessary to address future challenges. As such, health experts from government, industry and academia have a shared responsibility to the societies they serve to ensure that pesticides are used in a manner that is safe for humans and the environment.

Risk assessment is an important tool that can be used in the regulatory process to make informed judgments about pesticide safety. It is a step-wise, iterative process of compiling relevant hazard and exposure information to answer important safety questions. Lower tier risk assessments are based on simplistic approaches using little or no data and conservative default assumptions, and higher tier assessments involve more sophisticated and complete data sets. More advanced (higher tier) assessments are conducted to improve confidence in the accuracy of the overall safety evaluation.

Occupational risk assessment for workers involved in agricultural production is an important priority for most regulatory authorities. Hazard characterization is typically the first step in this process and involves the selection of an appropriate toxicity endpoint(s) and uncertainty factor(s) for the route (dermal and/or inhalation) and duration (short-term, chronic, intermittent) of exposure. Exposure assessment is the second step and involves characterizing potential exposures for each route under the actual conditions of pesticide use. For workers who mix, load and apply pesticides, it requires knowledge of application equipment and rates, work practices, clothing worn, area treated, etc. Toxicity (hazard) is an inherent property of a pesticide and must be evaluated on a chemical-specific basis. In contrast, the exposure associated with pesticide use is generic in nature, meaning that exposure measured for one pesticide is the same as exposure to a different pesticide used in a similar manner. This allows for health experts to share resources in the development of generic worker exposure databases.