Transforming the Evaluation of Agrochemical Safety and Risk Assessment: Human Health Risk Example

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The present safety evaluation paradigm for agrochemicals is long-standing and anchored in well-established testing and evaluation procedures. A transformation from the current frameworks is needed that applies modern evaluation strategies to better support sustainable agriculture. This will be accomplished through the integration of state-of-the-art scientific methods, technologies and data sources, to inform safety and risk decisions for robust human and environmental safety and risk assessment of agrochemicals. The success of this change requires reframing the safety evaluation into one that incorporates new scientific tools and methodologies that ensure the safety of crop protection products for both humans and the environment. Currently, more than 8,000 vertebrate animals are expended in the development of a new pesticide active ingredient to address human health risk. Reducing and replacing vertebrate animals in toxicity studies that inform the regulatory risk assessment for agrochemicals is of global interest as reflected in the most recent literature and also in the 2019 Directive from USEPA to eliminate vertebrate testing for regulatory approvals and the associated USEPA workplan. Transforming the Evaluation of Agrochemicals (TEA) is an initiative proposed by the Health and Environmental Sciences Institute (HESI) to reframe the safety evaluation of crop-protection. To deliver faster, more sustainable agrochemical registrations, frameworks have been developed and applied to establish an approach to generate the necessary information to meet the regulatory requirements for a new pesticide registration without the use of chemical-specific vertebrate tests. A workflow was established for the prediction of human safety endpoints that defined both exposure and hazard and then combined them for risk assessment. Exposure was based on proposed uses of the new active ingredient, using established tools to estimate residues, dietary intake, and operator exposure. For hazard, a comparative assessment of registered active ingredients from the same pesticide mode of action class addresses the hypothesis that a new active ingredient will be no more toxic than any existing of that class and use. Risk assessment endpoints were collected from EPA Human Health Risk Assessment documents and used to establish the range of possible endpoints for the analog chemicals. Favorable risk assessments were predicted for all exposure scenarios, demonstrating this approach creates the opportunity to conduct human health-protective risk assessments without performing new mammalian toxicity studies. The presentation will demonstrate a modern scientifically sound and robust strategy for human safety and risk that applies appropriate and flexible exposure and effects characterization without chemical-specific vertebrate tests to reliably address risk, uncertainties, and deficiencies in data and its interpretation with equivalent confidence as do the currently accepted test guidelines and meet regulatory and business needs.