

Exploring Ways to Reduce Animal Testing in Support of the Registration of Pesticides by the U.S. Environmental Protection Agency

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As part of the U.S. Environmental Protection Agency's (EPA) commitment to reducing animal testing, the Office of Pesticide Programs (OPP) is critically evaluating which studies form the basis of OPP decisions. EPA uses one of these types of studies, the fish acute toxicity test, to assess and manage potential risk from pesticides to fish species. For each pesticide, the Agency typically requires in vivo testing of three different fish species: a cold and warm freshwater species and a marine/estuarine species. We conducted a retrospective study to determine whether all three species are necessary to evaluate potential risk or whether fewer species can provide sufficient information to the Agency to support pesticide registration decisions that are protective of public health and the environment. In conducting the study, we extracted and curated median lethal concentration (LC₅₀) values (by unit consistency and chemical identification) from approximately 700 of the fish acute toxicity studies submitted to the Agency. We then analyzed the curated dataset to determine if there are species-related patterns in acute sensitivity. One analysis compared the LC₅₀ values by looking at the relative relationship in sensitivity among the three species tested for each pesticide active ingredient. Another evaluation compared the LC₅₀ values for each chemical/species pairing to EPA and United Nations Globally Harmonized System hazard categories to determine whether the species tested influenced hazard categorization. Finally, we considered if different pesticide modes of action impacted species-related patterns in acute sensitivity. These study results will inform whether all three species are necessary to assess acute lethal risk to fish and provide the basis for exploring a potential reduction in species testing that may save animals and resources. This project was funded in part with federal funds from the NIEHS, NIH under Contract No. HHSN273201500010C.