Monthly EPA OPP SME Liaison Comments

Sorry I can't attend today's meeting owing to synchronous teaching obligations this semester between 12 and 3 pm on Tuesday and Thursday. However, I wanted to narrate "new" news about chlorpyrifos.

EPA decided to revisit the chlorpyrifos human health risk assessment. In their earlier revised risk assessment (circa 2016/2017) they used as toxicological endpoints psychological tests of mental acuity from one of several epidemiological studies about chlorpyrifos effects on children followed from birth. Blood levels of the metabolite trichloropyridinol (TCP), the hydrolysis metabolite of chlorpyrifos (but also of the chlorinated pyridinol herbicide trichlopyr), were reported as an independent variable in the chosen epidemiological study. To estimate actual body doses associated with changes in mental acuity scores, EPA used a pharmacokinetic model and the blood concentrations of TCP. The results of the risk analysis showed extraordinarily high exceedance of EPA's level of concern, which was based on the reference dose (RfD) after applying appropriate safety factors to the point of departure analysis for the dose-response function generated on the basis of the epidemiological endpoints.

Recently (i.e., September 2020), however, EPA revisited their risk assessment assumptions and decided to revert to the methodology used for cumulative risk assessment of OP insecticides. Specifically, they decided to use RBC (red blood cell) acetylcholinesterase (AChE) inhibition in female rodent studies and a point of departure approach to derive the toxicological benchmark (the POD is 10% inhibition of RBC AChE). After applying safety factors to derive the equivalent of the RfD (or population adjusted dose to account for demographic variability in response), EPA found that the potential exposure did not exceed their levels of concern. The overall conclusion therefore supported EPA's decision not to take action on chlorpyrifos at this time. The rationale used for changing the basis of the toxicological endpoint from an epidemiology study to the use of RBC AChE inhibition was stated as follows, "Despite several years of study, the science addressing neurodevelopmental effects [i.e., the "mental acuity study results"] remains unresolved. Therefore, the dietary, residential, aggregate, and non-occupational risk assessments have been conducted both with and without retention of the 10X FQPA safety factor."

I was interviewed by a regional newspaper journalist about this issue last week and explained what EPA was doing. I haven't seen the resulting news story at this time. Nevertheless, environmental advocacy groups are up in arms, and as other governmental agencies with regulatory responsibilities have been tainted by the toxic politics of the day, so has the EPA suffered another blow to its reputation. What is most distressing, however, is the continued misinformation that conflates Nazi development and use of OP oxons (i.e., phosphoroates in contrast to phosphorothioates) as highly orally and dermally toxic weapons of murder with the independent development of OP insecticides for crop protection. Indeed, even a NY Times editorial board opinion from 2019 made this same mistake and did not recognize that chlorpyrifos was synthesized in the 1960s and commercialized by the early 1970s.

In summary, after five years of hand wringing about the fate of the registration of chlorpyrifos, we seem to be back to where we began before the epidemiological data had been used for EPA's risk assessment.