Risk assessment is a process designed to answer questions about how toxic a chemical is, what exposure results from its various uses, what is the likelihood of use causing harm, and how to characterize the risk. Risk assessment plays a critical role in the California Department of Pesticide Regulation's (DPR) evaluation of the potential human health hazards associated with pesticide exposure. DPR uses a comprehensive approach to assess potential dietary (food and drinking water), workplace, residential, and ambient air exposures. DPR’s Human Health Assessment Branch – Risk Assessment (RAS) Section develops risk assessments that estimate the risk from relevant exposure scenarios.

What is human health risk assessment?

- An estimation of health risks derived from exposure to pesticides; uses best available scientific data to assess toxicity and exposure.

What is the goal of risk assessment?

- To provide realistic estimates of risk in order to protect individuals from harm when pesticide exposure is plausible.

What types of health effects are considered?

- Non-cancer effects (e.g., body weight reductions, physiological deficits, organ pathology), as well as carcinogenesis.

What exposure routes/durations are considered?

- Oral, inhalation, and dermal; Acute, subchronic and chronic.
- General population; Potentially sensitive populations.

The 4-Step Risk Assessment Process

1. Hazard Identification: What health effects are caused by the pesticide?
2. Dose-Response: What are the health effects at different exposure levels?
3. Risk Characterization: What is the risk of health effects in the exposed population?
4. Exposure: How much of the pesticide are we exposed over a specific period of time? Who is exposed?

Risk Assessment of Imidacloprid

- Figure 1. Locomotor activity in Females Rats on Day 0
- Figure 2. Benchmark dose analysis of female rat locomotor activity for Interval 3

Table 1 (right). Acute oral studies considered for imidacloprid NOEL selection

- Species Exposure NOEL LOEL (BMDL) (BMD) Endpoint Ref.
- Rat 5/sex/dose Gavage, single LD50 study 50 100 Apathy, labored breathing, tremors, gait incoordination, ↓ mobility, nasal and urine staring 1*
- Rat 18/sex/dose Gavage, single Acute Neuro 42 (30) 151 (84) Motor and locomotor activity ↓ Motor and locomotor activity (F- Int. 3, Day 0) 2*
- Rat 25 dams/dose Gavage, GD 6-15 Dev. Tox. 30 100 Dark ↓ Body weight gain and food consumption, ↓ incidence of wavy ribs, high male/female ratio Dark: ↓ Body weight gain (GD 6-21) 3*
- Rat 50 dams/dose (pups evaluated for Dev. Tox.) Oral, Dev. Tox. Pups were indirectly exposed for 20 days in utero and 21 days via lactation 5.5 55 Decreased widths of corpus caudatum and caudate putamen in PND11 rats 4*