

# Potential Designated Pesticides

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# Potential Designated Pesticides

## ▶ Iprodione

- Top 100 Pesticides (pounds applied)
- High agricultural use

## ▶ Oethilinone

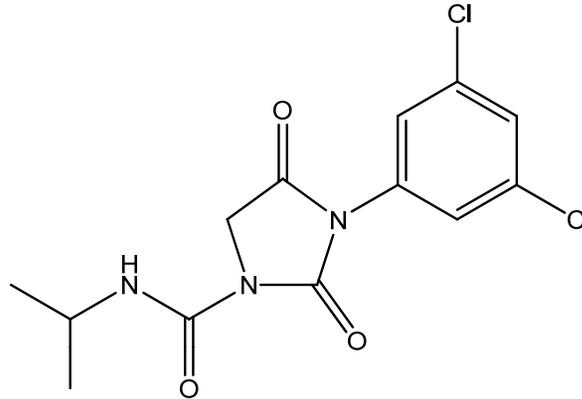
- Top 100 Pesticides (pounds applied)
- Use on residential and consumer products

## ▶ Fipronil

- Pet pesticide
- Household/garden use



# IPRODIONE



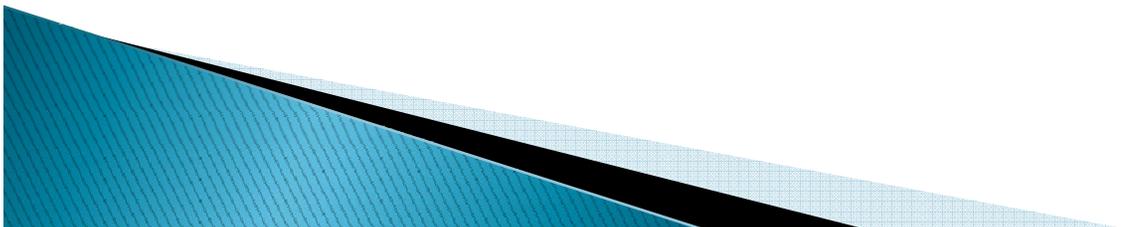
## Widely used fungicide

- High use on almonds, lettuce, carrots, peaches
- Residues found on produce samples

# Iprodione:

## Known or suspected health effects

- ▶ Proposition 65 cancer
- ▶ Endocrine disruption
  - anti-androgen
- ▶ Other dicarboximide fungicides also carcinogenic, anti-androgenic
  - vinclozolin and procymidone



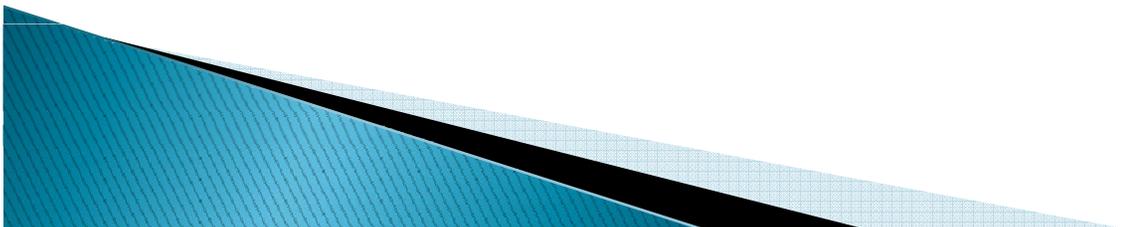
# Iprodione: Potential to biomonitor

## ▶ Physical and chemical properties:

<b>Molecular Weight</b>	<b>330.17</b>
<b>Vapor Pressure</b>	<b><math>3.75 \times 10^{-9}</math> mm Hg</b>
<b>Water solubility</b>	<b>13.9 mg/L</b>
<b>Octanol/Water Partition Coefficient</b>	<b>Log <math>K_{ow}</math> 3.0</b>

## ▶ Pharmacokinetics and metabolism:

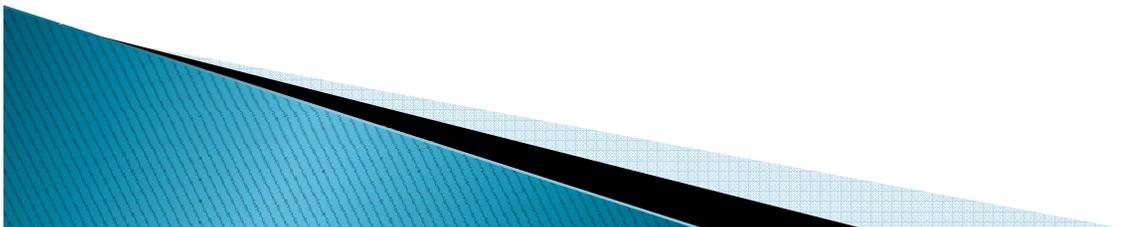
- Rapidly converted to 3,5-dichloroaniline (3,5-DCA)
- 3,5-DCA excreted in urine.



# Iprodione:

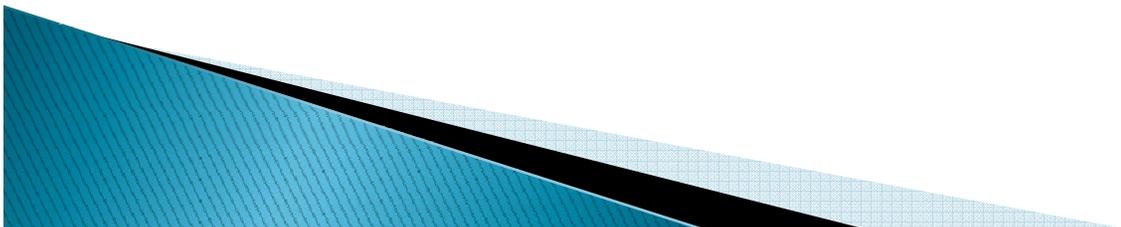
## Potential to biomonitor

- ▶ Past biomonitoring studies:
  - 3,5-DCA found in 151 of 153 urine samples.  
Turci et al. (2006)
- ▶ Other sources of 3,5-DCA:
  - Vinclozolin – limited use in California
  - Procymidone – not registered for use in U.S.
  - Use as chemical intermediate – extent in California not known



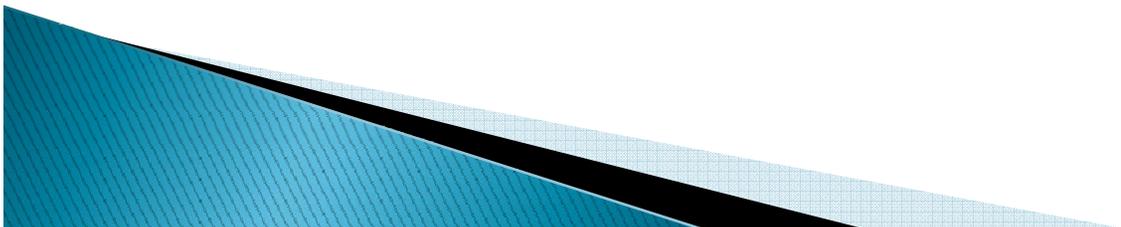
# Iprodione: Analytical methods

- ▶ GC/Ms and LC/MS methods developed
- ▶ Analysis can be bundled with other dichloroanilines  
(e.g., metabolites of diuron, propanil, triclocarban)

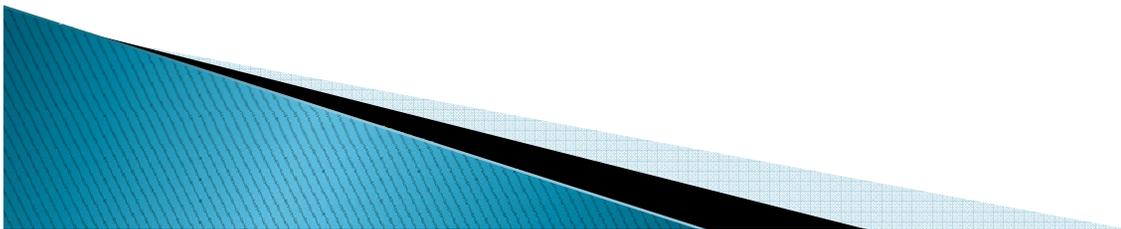


# Iprodione: Need to assess efficacy of public health actions

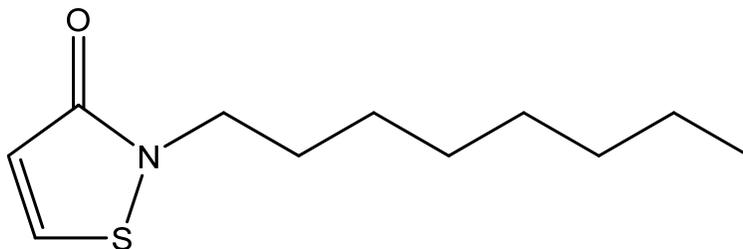
- ▶ Widely used agricultural pesticide
- ▶ Residues found on produce samples
- ▶ Concerns for cancer and endocrine disruption
- ▶ Biomonitoring would help assess extent of exposure in California



# QUESTIONS ?



# Octhilinone

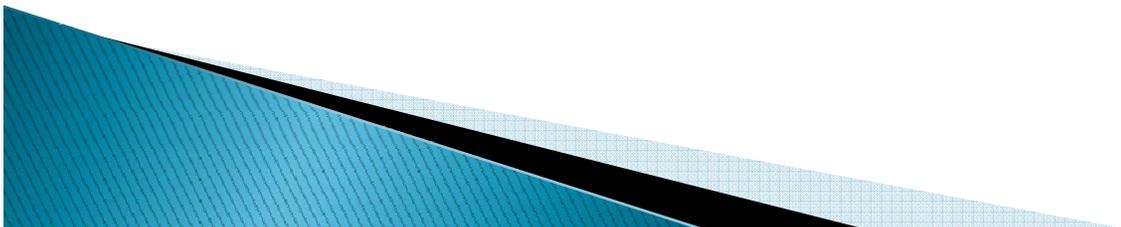


Mildewcide, fungicide, bacteriocide

- ▶ 2.5 million lbs sold in 2007
- ▶ Use on lumber: 444,257 lbs in 2007
- ▶ Use in household products
  - Paints and coatings, carpets, clothing, upholstery fabric, linens, mattress covers, leather and plastic products

# Octhilinone: Household exposures

- ▶ U.S. EPA child exposure scenarios
  - Dermal: carpets, textiles, mattress covers
  - Oral: plastic toys, textiles, carpets
- ▶ U.S. EPA actions
  - Prohibited use in plastic toys, in carpet fibers
  - Required reduction in amount in mattress covers
  - Requested study on residue transfer
- ▶ Use in products manufactured outside of U.S. unknown



# Octhilinone:

## Known or suspected health effects

- ▶ Database meets requirements for anti-microbials
  - No adequate studies for carcinogenicity, chronic toxicity, neurotoxicity and pharmacokinetics/metabolism
  - One positive study for chromosomal aberrations
- ▶ Isothiazolone class of chemicals
  - React with cellular thiols (e.g., cysteine residues)
  - *In vitro* studies, neurotoxicity and decreased cellular glutathione
- ▶ Occupational findings
  - Cases of allergic contact dermatitis
  - Isothiazolones associated with occupational asthma

# Octhilinone: Potential to biomonitor

- ▶ **Physical and chemical properties:**

<b>Molecular Weight</b>	<b>213.34</b>
<b>Vapor Pressure</b>	<b><math>3.68 \times 10^{-5}</math> mm Hg</b>
<b>Water solubility</b>	<b>525 mg/L</b>
<b>Octanol/Water Partition Coefficient</b>	<b>Log <math>K_{ow}</math> 3.42</b>

- ▶ **Pharmacokinetics/metabolism data not identified**

- ▶ **Persistence:**

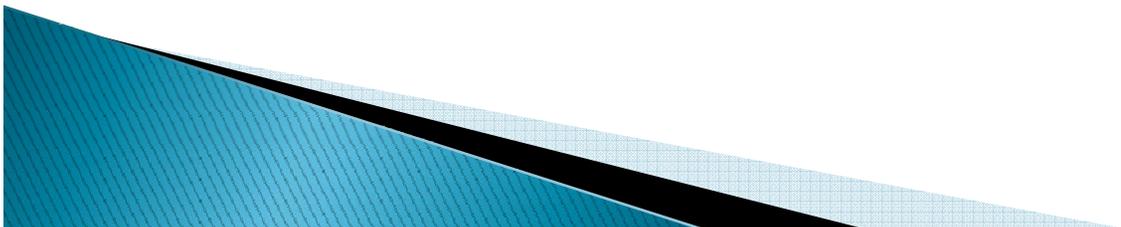
- Outdoors: soil binding, microbial degradation
- Indoors: unknown

- ▶ **Analytical methods would need to be developed**

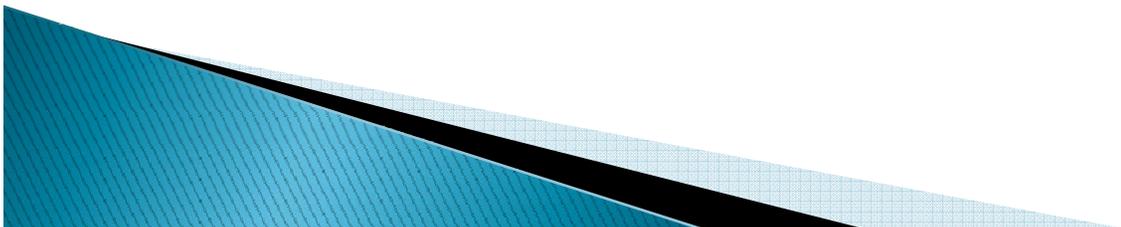
- Cannot likely be bundled with other analytes

# Octhilinone: Need to assess efficacy of public health actions

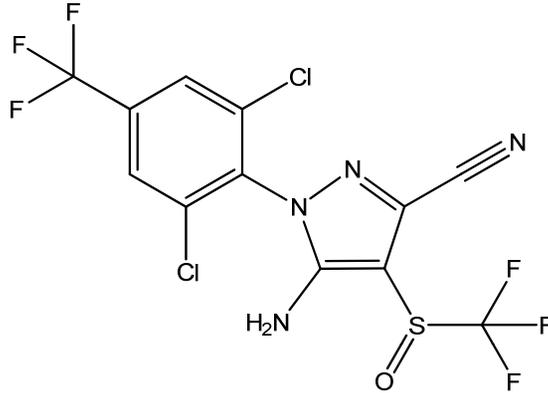
- ▶ Evidence of increasing use, potential for widespread exposure
- ▶ Toxicity not well characterized
- ▶ Biomonitoring would:
  - Help assess exposure
  - Evaluate need for further study



# QUESTIONS?



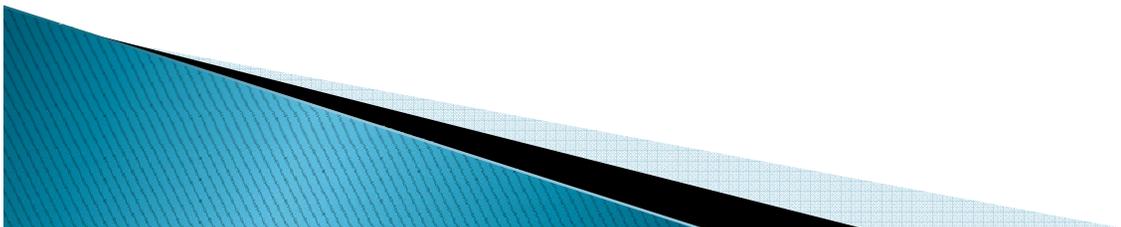
# Fipronil



- ▶ Widely used tick and flea treatment for dogs and cats
- ▶ Home and garden use: Cockroaches, ants
- ▶ Structural pest control: ~65,000 lbs in 2007

# Fipronil: Exposure

- ▶ Residues found in 40% of U.S. homes studied in 2005–2006
- ▶ Potential hand-to-mouth exposure from contact with treated pets
  - Particular concern for children



# Fipronil: Known or suspected health effects

- ▶ Possible human carcinogen (US EPA)
- ▶ Potential for neurodevelopmental toxicity
- ▶ GABA receptor antagonist
- ▶ New research
  - Decrease in thyroid hormone related to induction of liver UDP-glucuronyltransferase
  - Induces cytochrome P450 isozymes

# Fipronil: Potential to biomonitor

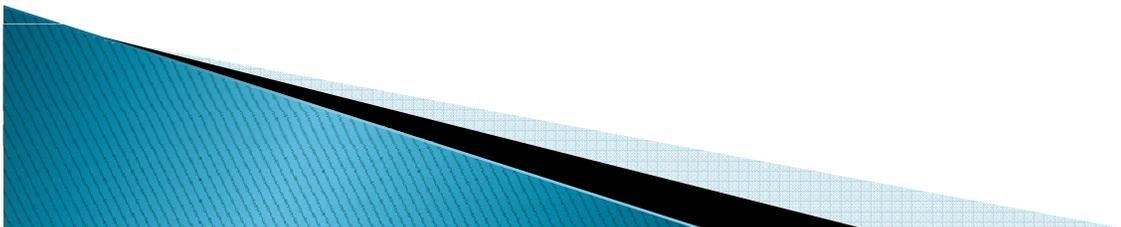
## ▶ Physical and chemical properties

Molecular Weight	437.15
Vapor Pressure	$2.78 \times 10^{-9}$ mm Hg
Water solubility	1.9 mg/L
Octanol/Water Partition Coefficient	Log $K_{ow}$ 4.0

## ▶ Persistence

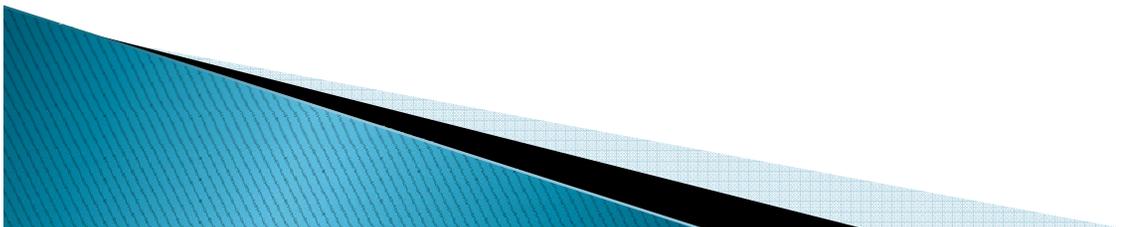
- Slowly degrades in soil
- In sunlight, rapid conversion to desulfinyl-fipronil

## ▶ Desulfinyl-fipronil and fipronil-sulfone potential to bioaccumulate



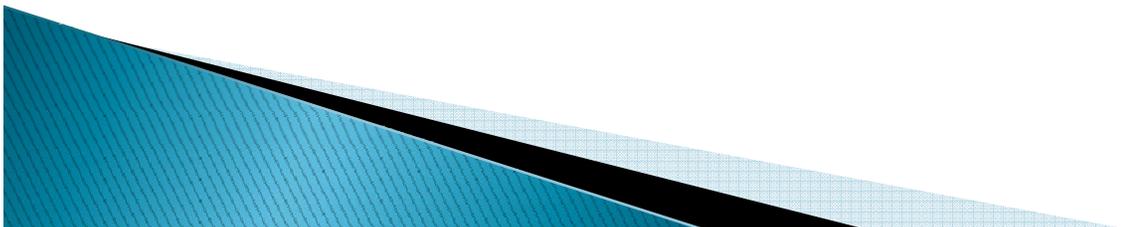
# Fipronil: Potential to biomonitor

- ▶ No human biomonitoring studies identified
- ▶ Analytical methods identified in scientific literature
  - Cannot likely be bundled with other analytes



# Fipronil: Need to assess efficacy of public health actions

- ▶ Use is increasing
- ▶ Potential for continuous exposure in home
  - Children may be at greater risk.
- ▶ Potential concerns for cancer, hormone disruption, and developmental neurotoxicity
- ▶ Biomonitoring will:
  - Help assess extent of exposure
  - Evaluate need for further study or action



# QUESTIONS?

