### Mobility Summary:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Reference</th>
<th>Value Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Solubility (mg/L)</td>
<td>0.0001</td>
<td>1</td>
<td>Low</td>
</tr>
<tr>
<td>Soil Sorption (Kd=mL/g)</td>
<td>Value not found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organic Sorption (Koc=mL/g)</td>
<td>1,400</td>
<td>1</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

**Mobility Summary:**

Allethrins are not soluble in water and are expected to adhere moderately to soil containing organic matter. When pynamin forte is used in mosquito coils and mats, it is released into the air where it will either be degraded by sunlight or get distributed in low concentrations on nearby surfaces. Eventually, when the remaining chemical is washed onto the ground, it will pose a moderate hazard to continue to move with water from that spot.

### Persistence Summary:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Reference</th>
<th>Value Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor Pressure (mm Hg)</td>
<td>0.0000012</td>
<td>3</td>
<td>Moderate</td>
</tr>
<tr>
<td>Biotic or Aerobic Half-life (days)</td>
<td>60</td>
<td>1</td>
<td>Moderate</td>
</tr>
<tr>
<td>Abiotic Half-life (days)</td>
<td>Data gap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrestrial Field Test Half-life (days)</td>
<td>Data gap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrolysis Half-life (days)</td>
<td>Stable at pH 4 to 7</td>
<td>4</td>
<td>High</td>
</tr>
<tr>
<td>Anaerobic Half-life (days)</td>
<td>Value not found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquatic Field Test Half-life (days)</td>
<td>Value not found</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Persistence Summary:**

Since pynamin forte products are released to the air, the main route of degradation is expected to be by sunlight. When used at night, more chemical will land on surfaces to be degraded later by sunlight or soil microbes. Sunlight will degrade pynamin forte within hours but soil degradation can take up to 60 days to reach half of the applied concentration. The hazard for chemical persistence is rated low in air and moderate on soil.
**BIOACCUMULATION**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Reference</th>
<th>Value Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioaccumulation Factor</td>
<td>Value not found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bioconcentration Factor</td>
<td>3,281</td>
<td>1</td>
<td>Moderate</td>
</tr>
<tr>
<td>Octanol/Water Partition Coefficient</td>
<td>log Kow = 4.96</td>
<td>1</td>
<td>High</td>
</tr>
</tbody>
</table>

**Bioaccumulation Summary:**

The EPA stated that the physical and chemical properties of allethrins indicate that there is a low potential for bioaccumulation although studies with a structurally similar type I pyrethroid chemical indicates the potential is high. Bioconcentration studies with allethrin compounds indicates that there is some accumulation in fish tissue although the accumulation is moderate. Human metabolism studies show that allethrins are quickly metabolised and eliminated with peak urine concentrations reached within 24 hours; rat studies indicate that half of ingested bioallethrin is eliminated from the body within 48 hours (References 5 and 6). The hazard of bioaccumulation of allethrin compounds is rated moderate.

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**ACUTE TOXICITY HAZARD - ECOTOXICITY**

<table>
<thead>
<tr>
<th>Test Subject</th>
<th>Value</th>
<th>Reference</th>
<th>Value Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honey bee or insect (LD50)</td>
<td>3.4 ug/bee</td>
<td>1</td>
<td>Moderate</td>
</tr>
<tr>
<td>Mammalian (LD50)</td>
<td>900 mg/kg</td>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>Avian (LD50)</td>
<td>2030 mg/kg</td>
<td>1</td>
<td>Low</td>
</tr>
<tr>
<td>Annelida -worms (LC50)</td>
<td>Value not found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annelida -worms (LC50)</td>
<td>Value not found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annelida -worms (LC50)</td>
<td>Value not found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mollusk (LC50)</td>
<td>Value not found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish (LC50)</td>
<td>0.0094 mg/L</td>
<td>6</td>
<td>High</td>
</tr>
<tr>
<td>Amphibian (LD50 or LC50)</td>
<td>Value not found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crustacean (LC50)</td>
<td>0.021 mg/L</td>
<td>1</td>
<td>High</td>
</tr>
</tbody>
</table>

**Acute Toxicity Testing and Ecotoxicity Summary:**

Single-dose toxicity testing of pynamin forte indicates that it is low in toxicity to birds, moderate in toxicity to animals, bees, and fish, but very highly toxic to other aquatic organisms.

Pynamin forte is found exclusively in coils, sticks, and mats that are used as insect repellant. Intended uses of these products are not expected to create significant concentrations of pynamin forte outside the area of use and therefore exposures to non-target organisms is expected to be small and mostly to occur while the products are in use. Residues of pynamin forte on vegetation are expected to be much lower than the level of concern for bees. The risk of toxicity from exposures to pynamin forte to non-target organisms (pets and wildlife) from insecticidal use is rated low in hazard.

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**ACUTE TOXICITY - Risk Assessment**

<table>
<thead>
<tr>
<th>Subject and Scenario</th>
<th>Route</th>
<th>Dose of Concern</th>
<th>Exposure</th>
<th>Margin of Safety</th>
<th>Reference</th>
<th>Value Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child on patio with 2 insect mats</td>
<td>Inhalation</td>
<td>0.0013 mg/kg/day</td>
<td>0.0007 mg/kg/day</td>
<td>1.8</td>
<td>2</td>
<td>High</td>
</tr>
<tr>
<td>Child on patio with 2 mosquito coils</td>
<td>Inhalation</td>
<td>0.0013 mg/kg/day</td>
<td>0.00018 mg/kg/day</td>
<td>7</td>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>Applicator risk is assumed to be low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined routes of exposure are not expected</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Acute Toxicity Risk Assessment Summary:**

Intended uses of allethrin insecticides are not expected to cause contamination to surface water or groundwater, therefore drinking water is not considered an exposure risk from allethrin insecticide use. There are currently no food or crop uses of allethrin insecticides. Dermal (skin absorption) toxicity testing with allethrin did not produce toxicity - therefore risk assessments for skin exposures were not required.

Pynamin forte products are used in coils and mats for repelling flies and mosquitoes. Risk from post-application inhalation exposures to pynamin forte was calculated by the EPA for the use of insect repellent mats (2 per patio) and mosquito coils (2 per patio). Inhalation exposures to include infants were evaluated with a dose of concern set at 0.0013 mg/kg/day. The potential exposure to a child was calculated to be more than half of the dose of concern for use of mat repellants which is rated high in hazard. Potential exposures to a child in the area of the mosquito coils was 7 times less than the dose of concern and is rated moderate in hazard.
CHRONIC TOXICITY HAZARDS

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Adverse Effect</th>
<th>Reference</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinogenicity</td>
<td>No evidence of carcinogenicity</td>
<td>-</td>
<td>2</td>
<td>Low</td>
</tr>
<tr>
<td>Mutagenicity (NOAEL)</td>
<td>Value not found</td>
<td>Positive and negative test results</td>
<td>2 and 3</td>
<td>Moderate</td>
</tr>
<tr>
<td>Neurotoxicity - (NOAEL)</td>
<td>Data gap</td>
<td>-</td>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>Endocrine Disruption</td>
<td>&quot;no evidence&quot;</td>
<td>-</td>
<td>2</td>
<td>Low</td>
</tr>
<tr>
<td>Developmental Toxicity (NOAEL)</td>
<td>Value not found</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reproductive Toxicity (NOAEL)</td>
<td>Value not found</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic Toxicity (NOAEL)</td>
<td>6 mg/kg/day</td>
<td>Microscopic liver changes</td>
<td>2</td>
<td>Check risk</td>
</tr>
</tbody>
</table>

Chronic Toxicity Hazard Summary:

There were specific developmental neurotoxicity testing data lacking for allethrins so the EPA placed an additional 10x safety factor on the human risk assessments to further protect infants and developing fetuses. The EPA states that pynamin forte is not considered mutagenic although review of studies by the Center for Disease Control (CDC) infers that there are mixed results in mutagenicity testing; some positive and some negative. The mixed results for mutagenicity evaluation is rated moderate in hazard (Reference 3). Cancer testing with pynamin forte did not produce any evidence of carcinogenicity and the EPA stated that in reviewing available toxicity testing of allethrins, there was no evidence of endocrine disruption (Reference 2). The EPA’s re-registration document for allethrin products states that developmental and reproductive toxicity was only observed at levels that were at or above concentrations that caused other toxicities (Reference 2). The hazard for developmental or reproductive toxicity is rated moderate when toxicity to the offspring occurs at the same concentration as toxicity to the parent.

CHRONIC TOXICITY - Risk Assessment

<table>
<thead>
<tr>
<th>Subject and Scenario</th>
<th>Route</th>
<th>Dose of Concern</th>
<th>Exposure</th>
<th>Margin of Safety</th>
<th>Reference</th>
<th>Value Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term exposure to pynamin forte not expected</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
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</tbody>
</table>

Chronic Toxicity Risk Assessment Summary:

There were no risk assessments evaluated by the EPA for exposures to pynamin forte for durations longer than 30 days because long-term exposures are not expected from mosquito repellant uses.

Metabolites and Degradation Products:

The metabolites and degradation chemicals of the allethrin compounds could not be found although the EPA stated that the parent compound (allethrins) is the only residue of toxicological significance (Reference 2).

Comments:

Pynamin forte is considered a slight eye irritant (EPA Toxicity Category III), but is not a skin irritant (EPA Toxicity Category IV) and it is not considered a skin sensitizer (Reference 2).

References