Section 1 - Product and Company Information

Product Name: R,S(+/-)-QUINUCLIDINYL BENZILATE
Product Number: C002
Brand: SIGMA

Company: Sigma-Aldrich Canada, Ltd
Address: 2149 Winston Park Drive
Oakville ON L6H 6J8 CA
Technical Phone: 9058299500
Fax: 9058299292
Emergency Phone: 800-424-9300

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)-QUINUCLIDINYL BENZILATE</td>
<td>6581-06-2</td>
<td>No</td>
</tr>
</tbody>
</table>

Formula: C21H23NO3
Synonyms:
- 1-Azabicyclo(2.2.2)octan-3-ol, benzilate (9CI)*
- Benzeneacetic acid, alpha-hydroxy-alpha-phenyl-,
  1-azabicyclo(2.2.2)oct-3-yl ester (9CI)*
- 3-Chinuclidylbenzilate * CS 4030 *
- 3-(2,2-Diphenyl-2-hydroxyethanoyloxy)-quinuclidin
  * EA 2277 * QNB * 3-Quinuclidinol benzilate *
- 3-Quinuclidinyl benzilate * 3-Quinuclidyl
  benzilate * Ro 2-3308
RTECS Number: DD4638000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Toxic (USA) Harmful (EU).
Harmful if swallowed.
Readily absorbed through skin. Target organ(s): Central nervous
system. Peripheral nervous system.

HMIS RATING
HEALTH: 2*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING
HEALTH: 2
FLAMMABILITY: 0
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures
ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.
Store at 2-8°C
Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State: Solid</td>
<td>Solid</td>
<td></td>
</tr>
<tr>
<td>Color: White</td>
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<td></td>
</tr>
<tr>
<td>Molecular Weight</td>
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</tr>
<tr>
<td>pH</td>
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<td></td>
</tr>
<tr>
<td>BP/BP Range</td>
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<td></td>
</tr>
<tr>
<td>MP/MP Range</td>
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<td></td>
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<tr>
<td>Freezing Point</td>
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<tr>
<td>Vapor Pressure</td>
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</tr>
<tr>
<td>Vapor Density</td>
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<tr>
<td>Saturated Vapor Conc.</td>
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<tr>
<td>SG/Density</td>
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<tr>
<td>Bulk Density</td>
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<tr>
<td>Odor Threshold</td>
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</tr>
<tr>
<td>Volatile%</td>
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<tr>
<td>VOC Content</td>
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<tr>
<td>Water Content</td>
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<tr>
<td>Solvent Content</td>
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</tr>
<tr>
<td>Evaporation Rate</td>
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<tr>
<td>Viscosity</td>
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<td>Surface Tension</td>
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<tr>
<td>Partition Coefficient</td>
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<tr>
<td>Decomposition Temp.</td>
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<tr>
<td>Flash Point</td>
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<td>Explosion Limits</td>
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<tr>
<td>Flammability</td>
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<tr>
<td>Autoignition Temp</td>
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<td>Refractive Index</td>
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<td>Optical Rotation</td>
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<td>Miscellaneous Data</td>
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<tr>
<td>Solubility</td>
<td>N/A</td>
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</tr>
</tbody>
</table>

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Conditions to Avoid: Exposure to light may affect product quality.
Exposure to moisture may affect product quality.
Materials to Avoid: Oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Nitrogen oxides.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Readily absorbed through skin.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: Harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Peripheral nervous system. Central nervous system.

SIGNS AND SYMPTOMS OF EXPOSURE
Hallucinogenic effects. Symptoms of exposure include increased heart rate, dry skin and mouth, mydriasis, blurred vision, ataxia, and disorientation and confusion progressing to stupor.

CONDITIONS AGGRAVATED BY EXPOSURE
The toxicological properties have not been thoroughly investigated.

TOXICITY DATA

<table>
<thead>
<tr>
<th>Route</th>
<th>Species</th>
<th>Dose</th>
<th>Mutation test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intraperitoneal</td>
<td>Mouse</td>
<td>103 MG/KG</td>
<td>Cytogenetic analysis</td>
</tr>
<tr>
<td>Intravenous</td>
<td>Mouse</td>
<td>25 MG/KG</td>
<td>Cytogenetic analysis</td>
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</table>

CHRONIC EXPOSURE - MUTAGEN

<table>
<thead>
<tr>
<th>Species</th>
<th>Route</th>
<th>Dose</th>
<th>Mutation test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse</td>
<td>Intraperitoneal</td>
<td>30 MG/KG</td>
<td>Cytogenetic analysis</td>
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<tr>
<td>Mouse</td>
<td>Intraperitoneal</td>
<td>100 MG/KG</td>
<td>Dominant lethal test</td>
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<tr>
<td>Hamster</td>
<td>Intraperitoneal</td>
<td>40 MG/KG</td>
<td>Cytogenetic analysis</td>
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</table>

Section 12 - Ecological Information
Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: Xn
Indication of Danger: Harmful.
R: 22
Risk Statements: Harmful if swallowed.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic (USA) Harmful (EU).
Risk Statements: Harmful if swallowed.
US Statements: Readily absorbed through skin. Target organ(s): Central nervous system. Peripheral nervous system.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.