1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier
Product Name: Terpinolene
Product Code: SC-236969

Recommended use of the chemical and restrictions on use
For research use only. Not intended for diagnostic or therapeutic use.

Details of the supplier of the safety data sheet
Santa Cruz Biotechnology, Inc.
10410 Finnell Street
Dallas, TX 75220
831.457.3800
800.457.3801
scbt@scbt.com

Emergency telephone number
Chemtrec
1.800.424.9300 (Within USA)
+1.703.527.3887 (Outside USA)

2. HAZARDS IDENTIFICATION

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification
Skin sensitization: Category 1
Aspiration toxicity: Category 1
Flammable liquids: Category 4

Label elements
Signal word: Warning
Hazard statements:
- May be harmful if swallowed
- May cause an allergic skin reaction
- May be fatal if swallowed and enters airways
- Combustible liquid

Symbols/Pictograms

Precautionary Statements - Prevention
- Avoid breathing dust/fume/gas/mist/vapors/spray
- Contaminated work clothing should not be allowed out of the workplace
- Keep away from heat/sparks/open flames/hot surfaces. — No smoking
- Wear protective gloves/protective clothing/eye protection/face protection

Precautionary Statements - Response
- IF exposed or concerned: Get medical advice/attention
- IF ON SKIN: Wash with plenty of soap and water
- If skin irritation or rash occurs: Get medical advice/attention
- Wash contaminated clothing before reuse
- IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
- Do NOT induce vomiting
- In case of fire: Use CO2, dry chemical, or foam for extinction

Precautionary Statements - Storage
- Store locked up

Precautionary Statements - Disposal
- Dispose of contents/container to an approved waste disposal plant
Hazardous not otherwise classified (HNOC)
Hazardous not otherwise classified (HNOC) Not applicable

Other Information
Other hazards Harmful to aquatic life with long lasting effects. Very toxic to aquatic life.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS No.</th>
<th>Weight-%</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terpinolene</td>
<td>586-62-9</td>
<td>&gt;98</td>
<td>= 4390 mg/kg (Rat)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

<table>
<thead>
<tr>
<th>First Aid Measures</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>General advice</td>
<td>If symptoms persist, call a physician.</td>
</tr>
<tr>
<td>Eye contact</td>
<td>Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. If symptoms persist, call a physician.</td>
</tr>
<tr>
<td>Skin Contact</td>
<td>Immediate medical attention is not required. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. If skin irritation persists, call a physician.</td>
</tr>
<tr>
<td>Inhalation</td>
<td>Immediate medical attention is not required. If symptoms persist, call a physician. Move to fresh air in case of accidental inhalation of vapors or decomposition products.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Call a physician. Do NOT induce vomiting.</td>
</tr>
<tr>
<td>Self-protection of the first aider</td>
<td>Use personal protective equipment as required.</td>
</tr>
</tbody>
</table>

Most important symptoms and effects, both acute and delayed
Symptoms No information available.

Indication of any immediate medical attention and special treatment needed
Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

<table>
<thead>
<tr>
<th>Suitable Extinguishing Media</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suitable Extinguishing Media</td>
<td>Use. Dry chemical. Carbon dioxide (CO2). Water spray (fog). Alcohol resistant foam.</td>
</tr>
<tr>
<td>Unsuitable Extinguishing Media</td>
<td>No information available.</td>
</tr>
</tbody>
</table>

Specific hazards arising from the chemical
Specific hazards arising from the chemical Keep product and empty container away from heat and sources of ignition. Risk of ignition.
chemical
Hazardous combustion products Carbon oxides.

**Explosion data**
- Sensitivity to Mechanical Impact: No information available.
- Sensitivity to Static Discharge: No information available.

**Protective equipment and precautions for firefighters**
- Protective equipment and precautions for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

### 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions, protective equipment and emergency procedures**
- Personal precautions: Use personal protective equipment as required. Remove all sources of ignition. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Pay attention to flashback. Take precautionary measures against static discharges.

**Environmental precautions**
- Environmental precautions: See Section 12 for additional Ecological Information. Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage if safe to do so. Prevent product from entering drains.

**Methods and material for containment and cleaning up**
- Methods for containment: Prevent further leakage or spillage if safe to do so.
- Methods for cleaning up: Soak up with inert absorbent material. Dam up. Pick up and transfer to properly labeled containers. Take precautionary measures against static discharges.

### 7. HANDLING AND STORAGE

**Precautions for safe handling**
- Advice on safe handling: Use with local exhaust ventilation. All equipment used when handling the product must be grounded. Keep away from heat/sparks/open flames/hot surfaces. — No smoking. Use personal protective equipment as required. Do not breathe dust/fume/gas/mist/vapors/spray. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors).

**Conditions for safe storage, including any incompatibilities**
- Storage Conditions: Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Keep containers tightly closed in a cool, well-ventilated place. Keep away from heat. Keep in properly labeled containers. Store at room temperature.
- Incompatible materials: None known based on information supplied.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Control parameters**
- Exposure Guidelines: This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

**Appropriate engineering controls**
- Engineering Controls: Showers, Eyewash stations
Individual protection measures, such as personal protective equipment

Eye/face protection  
Tight sealing safety goggles.

Skin and Body Protection  
Protective gloves and protective clothing.

Respiratory protection  
If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations  
When using do not eat, drink or smoke. Regular cleaning of equipment, work area and clothing is recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>No information available</td>
</tr>
<tr>
<td>Odor</td>
<td>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>No information available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>-20 °C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>184 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>61 °C CC (closed cup)</td>
</tr>
<tr>
<td>Liquid Density</td>
<td>0.86 g/mL</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No information available</td>
</tr>
<tr>
<td>Upper flammability limits</td>
<td>No information available</td>
</tr>
<tr>
<td>Lower flammability limit</td>
<td>No information available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>0.5 mmHg</td>
</tr>
<tr>
<td>Vapor density</td>
<td>4.7</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>No information available</td>
</tr>
<tr>
<td>Water solubility</td>
<td>No information available</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>No information available</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>4.47</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>220 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No information available</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>No information available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No information available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No information available</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity  
Not applicable

Chemical stability  
Stable under recommended storage conditions.

Possibility of Hazardous Reactions  
None under normal processing.

Hazardous polymerization  
No information available.

Conditions to avoid  
Heat, flames and sparks.

Incompatible materials  
Strong oxidizing agents.

Hazardous Decomposition Products  
Carbon oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation  
No data available.

Eye contact  
No data available.
**Skin Contact**  No data available.

**Ingestion**  No data available.

### Information on toxicological effects

#### Symptoms
No information available.

#### Delayed and immediate effects as well as chronic effects from short and long-term exposure

#### Chronic Toxicity
No information available.

### Numerical measures of toxicity - Product Information

**Unknown acute toxicity**  No information available

The following values are calculated based on chapter 3.1 of the GHS document

- **ATEmix (oral)**  4390 mg/kg

### 12. ECOLOGICAL INFORMATION

#### Ecotoxicity
Harmful to aquatic life with long lasting effects

0% of the mixture consists of components(s) of unknown hazards to the aquatic environment.

- **Persistence and degradability**  No information available.
- **Bioaccumulation**  No information available.
- **Mobility**  No information available.

### 13. DISPOSAL CONSIDERATIONS

**Disposal of wastes**  Disposal should be in accordance with applicable regional, national and local laws and regulations.

**Contaminated packaging**  Do not reuse container.

### 14. TRANSPORT INFORMATION

**DOT**

- **UN/ID no**  UN2541
- **Hazard Class**  3
- **Packing Group**  III
- **Proper shipping name**  Terpinolene
- **Description**  UN2541, Terpinolene, 3, III
- **Emergency Response Guide Number**  128

**IMDG**

- **UN/ID no**  UN2541
- **Hazard Class**  3
- **Packing Group**  III
- **Proper shipping name**  Terpinolene
- **Description**  UN2541, Terpinolene, 3, III, Marine pollutant
- **EmS-No**  F-E, S-E

**IATA**

- **UN/ID no**  UN2541
- **Hazard Class**  3
15. REGULATORY INFORMATION

International Inventories
All of the components in the product are on the following Inventory lists
TSCA (United States): Canada (DSL/NDSL) Europe (EINECS/ELINCS/NLP) Australia (AICS) South Korea (KECL): China (IECSC) ENCS (Japan): Philippines (PICCS)

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>ENCS</th>
<th>IECSC</th>
<th>KECL</th>
<th>PICCS</th>
<th>AICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terpinolene</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

X - Listed
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories
Acute health hazard Yes
Chronic Health Hazard No
Fire hazard Yes
Sudden release of pressure hazard No
Reactive hazard No

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terpinolene</td>
<td>X</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>586-62-9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. OTHER INFORMATION

Revision note
No information available

Disclaimer
The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the

Santa Cruz Biotechnology, Inc.  www.scbt.com
The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet