Creating Value Through Innovative Solutions

Surround is marketed by NovaSource, a business unit of Tessenderlo Kerley, Inc., Phoenix, Ariz. NovaSource was created to develop and market off-patent and novel crop protection products. Our mission is to create value for our customers by providing innovative solutions for their crop protection needs. We employ a global network of formulation technologists, active ingredient suppliers, and specialized marketing partners, all with unique capabilities to develop exceptional product offerings. Concentrating on niche segments, we serve the agriculture, horticulture, turf, forestry, and aquatic, markets. Our goal is to deliver products that provide a sound business benefit to our customers.

Tessenderlo Kerley, Inc.
2255 North 44th Street
Suite 300
Phoenix, AZ 85008-3279
Customer Service:
1-800-525-2803
1-602-889-8300
www.novasource.com

Surround® Crop Protectant for Plant Surface Protection

Important: Always read the label before buying and follow label instructions when using this product.
The use of Surround® WP in agricultural crop protection applications is covered by US Patents 6,027,740; 6,069,112; 6,110,867 and 6,156,327.

CONDITIONS OF SALE – LIMITED WARRANTY AND LIMITATIONS OF LIABILITY AND REMEDIES
Failure to strictly follow label directions may cause injury to crops, animals, man or the environment. Tessenderlo Kerley, Inc. (TKI) warrants that the product conforms to the chemical description on the label and is reasonably fit for the purpose referred to in the directions for use when properly applied in normal weather conditions. TKI makes no other warranty or representation of any kind, express or implied, concerning the product, including no implied warranty of merchantability or fitness for any particular purpose. The exclusive remedy against TKI for any cause of action relating to the handling or use of the product is a claim for actual out-of-pocket damages, and in no event shall TKI be liable for special, indirect, incidental or consequential damages or expense of any nature, including, but not limited to, loss of profits or income, whether or not based on the negligence of TKI, breach of warranty, strict liability in tort, or any other cause of action. TKI and the seller offer the product, and the buyer and users accept it, subject to the foregoing conditions of sale and limitations of warranty, liability and remedies.

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NS-BRUS 11/08
Sunburned fruit is wasted fruit
High temperatures and solar radiation can damage pineapple plants and fruit, resulting in significant financial losses. In pineapples, sunburn can occur whenever the sun’s rays are strong and temperatures exceed approximately 90°F (32°C). External sunburn, or bleaching, manifests as bleached, yellow-white skin that turns pale gray/brown with damage to the tissue underneath. Damaged areas are susceptible to infection. Internal sunburn, or “boiling,” is thought to be the result of high air temperatures. Highly translucent fruit appear to be most susceptible to internal sunburn, which renders the fruit unfit for commercial use.

Proven to reduce sunburn damage
Since 2000, growers around the world have successfully used Surround to manage sunburn and heat stress in many tree fruit, vine and vegetable crops. Replicated trials in Australia, South Africa, and Costa Rica show that sequential applications of Surround significantly reduce the incidence of external and internal sunburn in pineapples.

Trials confirm reduced damage

**Australia**
Based on an Australian study, two different Surround programs reduced bleaching of fruit significantly when compared to the untreated control.

**Costa Rica**
In a study in the hot dry conditions of western Costa Rica, Surround cut fruit waste nearly in half (48.9 percent), contributing to higher yields. Applications of Surround also prevented leaf yellowing. The absence of leaf damage appears to have contributed to increased yields as manifested in larger fruit – more 4/box and 5/box fruit.

**South Africa**
In a study in South Africa, Surround® reduced the incidence of sunburn by an average of 46 percent.

<table>
<thead>
<tr>
<th>Internal sunburn reduction</th>
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</thead>
<tbody>
<tr>
<td>Treatment</td>
</tr>
<tr>
<td>Surround® WP</td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>% Reduction</td>
</tr>
</tbody>
</table>

**Waste reduction**

<table>
<thead>
<tr>
<th>Treatment Site/A (Treatment lbs/A)</th>
<th>% Total Waste (of harvested fruits)</th>
<th>Percent Waste Reduction as compared to the untreated control</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11.0</td>
<td>–</td>
</tr>
<tr>
<td>57 (84)</td>
<td>8.8</td>
<td>20.5</td>
</tr>
<tr>
<td>82 (92)</td>
<td>5.6</td>
<td>48.9</td>
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</tbody>
</table>

**Engineered particles protect against heat stress**
Prolonged exposure to high temperatures and intense solar radiation can damage fruit and stress the entire plant. Surround is proven to keep plants cooler. In trials where temperatures regularly exceeded 90-95°F (32-35°C) Surround reduced the temperature of treated leaves by 5-9°F (3-5°C).

**Apply Surround early for maximum plant surface protection**
Per label instructions, begin applying Surround to plants and fruit prior to the onset of high temperatures or at the onset of the dry season. Reapply at intervals no longer than 30 days. Shorter intervals may be needed depending on weather and the amount of Surround remaining on the plants from earlier treatments. For sunburn protection, fruit and other plant surfaces should be thoroughly covered with one to two full-rate applications before conditions leading to sunburn occur.

**Application recommendations**
Surround can be applied using conventional application equipment, and Surround can be tank-mixed with most commonly used fungicides or pesticides. Concentrations are 3 percent to 5 percent in the amount of water typically used per hectare.
- Calibrate sprayer and spray according to plant row volume
- Spray to “near drip” coverage (before the point of runoff)
- Reapply to reestablish coverage after heavy rain, wind, erosion or new growth
- Always add Surround before other tank mix materials

**Remove Surround at the packing plant**
Surround is made from specially formulated kaolin, an inert, naturally occurring mineral that is used in cosmetics and toothpaste, and which is approved by the U.S. Food and Drug Administration (FDA) for use as a food additive up to 2.5 percent.

Surround residues should present no concerns for processed (canned) pineapple. However, residual white Surround deposits must be removed from fresh market pineapples. High pressure water sprays installed in the packing plant prior to waxing have proven extremely effective and are recommended by Tessenderlo Kerley.