

# REDUCE SUNBURN AND HEAT STRESS IN CITRUS

**Surround®**  
Agricultural Crop Protectant

## Use of Surround to Control Sunburn and Heat Stress

Surround® represents a breakthrough opportunity for citrus fruit protection. SURROUND covers plant surfaces with a protective white film — a layer of highly engineered kaolin particles that reflect harmful infrared and ultraviolet radiation. The advanced particle film technology behind SURROUND Agricultural Crop Protectant was co-developed with the U.S. Department of Agriculture and can significantly reduce losses from sunburn, bleaching and heat stress.

### **SURROUND is designed to:**

- Reflect the sun's heat without inhibiting photosynthesis;
- Provide good coverage;
- Provide controlled adhesion to the plant canopy and fruit;
- Tank-mix with most other crop sprays; and,
- Mix easily in water.

### **Damage From the Sun**

The sun's heat can cause considerable damage to citrus crops. One type of damage is sunburn, a visible necrotic spot on fruit surfaces. A different type of damage, heat stress, also can cause significant loss. Heat stress is often less noticeable than sunburn, but plants undergoing heat stress respond by shutting down the photosynthetic process. When this occurs, citrus plants can drop some of their fruit load. Heat stress also manifests itself as reduced foliar flushes, especially in young trees, and reduced brix development.

While sunburn and heat stress are different, they both result from excessive exposure to infrared light from the sun and can be equally as devastating in reducing crop quality and yield. The key to reducing damage is reducing the heat load by maintaining cooler tree and fruit temperatures.

### **How SURROUND Reduces Sunburn Damage**

SURROUND reflects substantial amounts of infrared (IR) and ultraviolet (UV) light, keeping exposed fruit surfaces markedly cooler while allowing photosynthetically active radiation (PAR) to pass through to leaf and fruit surfaces. The SURROUND protective coating reduces the intensity of the hot spot where severe sunburn damage occurs. Young plants can be especially helped by SURROUND because their open structure casts little shade to protect fruit.

### **Fruit Drop Reduction**

Heat stress relief results in increased photosynthesis, thereby providing more carbon in the tree for fruit development and retention. Untreated trees in hot early season conditions drop fruit when there is not enough photosynthesis to support high fruit loads. SURROUND treatments help trees maintain higher fruit loads. Lessening of fruit drop with SURROUND is most likely to be attained when above-average temperatures occur in the weeks following petal fall.



**TESSENDERLO KERLEY, INC.**  
2910 North 44th Street  
Suite 100  
Phoenix, AZ 85018-7272

**CUSTOMER SERVICE:**  
800-525-2803  
602-889-8300

[novasource.com](http://novasource.com)

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## Recommendation for Citrus

Such as lemon, lime, grapefruit, mandarin, satsuma mandarin, pummelo, tangelos, kumquat, and oranges

Problem	Pounds / Acre	Application Instruction
Sunburn and heat stress	50-75	Apply to sunburn-prone fruit, leaf, limb, and trunk surfaces before conditions leading to sunburn occur. If initiating sprays for sunburn suppression where there have been no prior sprays, provide thorough coverage of all fruit and plant surfaces prior to sunburn-causing conditions with one to two full rate applications 7 days apart. Depending upon the length of the high heat period, three to four applications in total often are needed. Make subsequent applications at half to full rates if even coverage is maintained throughout the high heat period. Under windy conditions, SURROUND WP can be rubbed off by leaf movement making reapplication necessary.

## Application Tips

- Apply SURROUND to near-drip. Avoid run-off.
- Changing direction of travel on alternate applications will improve coverage.
- SURROUND can be tank-mixed with fungicides or pesticides. When tank-mixing SURROUND WP with other materials, always add SURROUND to the tank first. A pre-mix tank is suggested for sprayers without mechanical agitation.

## Aerial Application

- Use no less than 10 gallons per acre. Best mixing results are achieved when mixing no more than 1 pound per gallon of water.
- SURROUND may be applied using standard aerial application nozzles.
- Make applications not more than 10 feet above the top of the largest plant unless a greater height is required for aircraft safety.
- When spraying at low relative humidity, increase droplet size to compensate for evaporation.

## Post-Harvest Wash Off

SURROUND-treated fruit is cleaned after harvest with normal brushing, water rinsing and waxing processes. Traces of SURROUND do not affect the quality of processed fruit.



Surround-Treated Fruit

**Important: Always read the label before buying and follow label instructions when using this product.**

The use of Surround® in agricultural crop protection may be covered by patents held by Tessenderlo Kerley, Inc. For more information, visit [novasource.com](http://novasource.com).

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