

# Surround<sup>®</sup>

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 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.

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## 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.

## RECOMMENDATION FOR CITRUS

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

Problem	Lbs/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 lb 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.

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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