

# Surround<sup>®</sup>

Crop Protectant



Surround-Treated Fruit

## Plant Surface Protection in Tomatoes Means Higher Packouts – And Greater Profit

Sunburn and heat stress take a major toll on tomatoes. Surround Crop Protectant, developed together with the United States Department of Agriculture (USDA), can significantly reduce losses from sunburn, bleaching and heat stress, resulting in increased fruit quality, greater plant vigor and higher marketable yields. That can add up to greater profitability.

### Plant Surface Protection

When applied before severe summer conditions set in and maintained throughout the hot season, Surround covers plant surfaces with a protective film – a layer of specially engineered kaolin particles that reflect harmful infrared and ultraviolet radiation.

### Reduce Sunburn Damage

Surround has been shown to significantly increase marketable yield by reducing sunburn damage. The amount of damage reduction depends on application rates and timing as well as the severity of weather conditions and stage of canopy collapse. Results will be better if the initial application can be made before canopy collapse or before fruit have begun to be damaged.

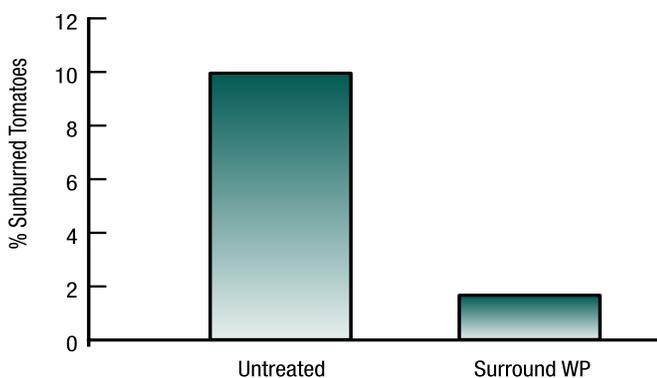
Sunburn can occur in tomatoes when air temperatures reach >86°F (30°C). Some tomato varieties can lose 20 percent of production to sunburn damage, bleaching and heat stress – with even greater losses in times of extreme heat.

Growers have used Surround for plant surface protection in many crops, including tomatoes, apples, citrus, grapes and walnuts, with significant reductions in sunburn, bleaching and heat stress.

### Season-Long Protection Against Heat Stress

Excessive heat can stress the entire tomato plant, causing irreversible damage to plant function or development. Temperatures higher than 90 to 95°F (32 to 35°C) can interfere with pollination and fertilization, contributing to poor fruit set. Higher temperatures may result in blossom and fruit drop or oddly shaped fruit. Heat also affects fruit color, as lycopenes and carotenes are not synthesized above 86°F (30°C).

Sunburn in Tomatoes



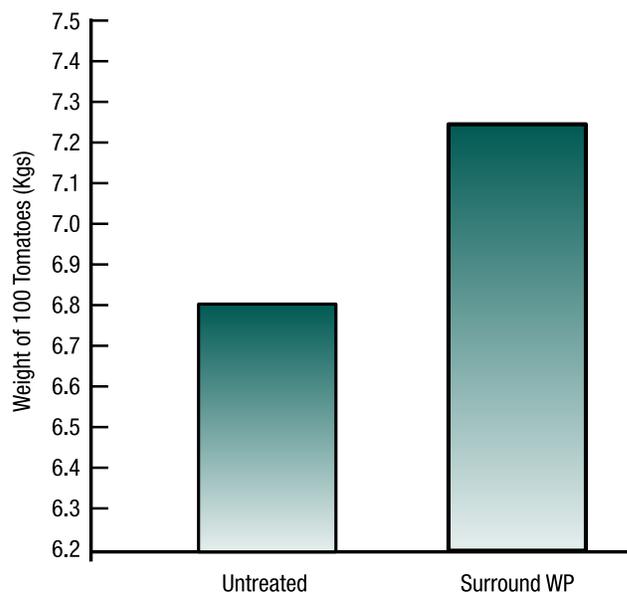
By reflecting the damaging heat and UV radiation of the sun, Surround reduces sunburn significantly, resulting in higher yields of quality tomatoes. In this study Surround reduced sunburn damage 72%.

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### Improved Yields in Tomatoes



When applied season-long, Surround has increased tomato yields, in this trial by 6.6%.

High daytime temperatures can increase evaporation – resulting in high transpiration rates and poor water uptake – resulting in reduced plant vigor. This can lead to early canopy collapse, ultimately exposing the fruit to more heat and solar radiation – and increasing the potential for damage.

In trials where temperatures regularly exceeded 90 to 95°F (32 to 35°C), Surround reduced the temperature of treated tomato leaves by 9°F (5°C). The engineered particles in Surround do not inhibit carbon dioxide uptake in leaves. Therefore by reducing plant temperatures Surround increases net photosynthesis. Trials where Surround was used season-long produced increased tomato weights and yields.

### Strategic Application Timing = Effective Protection

Heat stress reduction can be accomplished at any time during the life of the plant but is particularly beneficial during bloom, fruit set and early fruit formation.

Apply sunburn-reduction sprays during the period from fruit set to harvest. Good coverage of the fruit is important.

For either use, start applications before heat events occur and reapply in successive applications to improve and fill in coverage. A visual inspection of film deposition and coverage is essential to fine-tune spray coverage.

### Remove Surround at Processing

Normal tomato processing systems usually remove virtually all Surround WP film from fruit surfaces. Traces of residue should not affect quality of processed products. Check with the processor before use to ensure that Surround-treated produce is acceptable for processing. For more information on fruit washing see the Surround product information sheet titled Wash Guide.

**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.