



ENGELHARD

Surround[®]

Crop protectant

Plant Surface Protection in tomatoes means higher packouts of quality produce—and a more profitable operation.

Sunburn and heat stress take a major toll on tomatoes. As part of a planned treatment program, Engelhard Surround[®] crop protectant 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.

Surround represents a breakthrough opportunity for Plant Surface Protection in tomato crops

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.

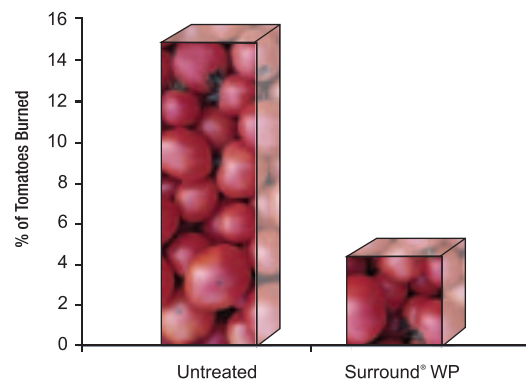
Proven to reduce sunburn damage by 50 percent or more

When applied according to label directions, Surround has been shown to significantly increase profitable yield. Damage reduction depends on application rate and timing as well as the severity of sunburn damage and stage of canopy collapse.

Sunburn can occur in tomatoes when air temperatures reach >86°F. 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. That often doesn't count unmarketable produce left unpicked.

Growers in the United States and elsewhere have used Surround for plant surface protection in many crops, including tomatoes, since 1999. California growers have successfully used Surround on apples, citrus, grapes, walnuts, and tomatoes with significant reductions in sunburn, bleaching and heat stress.

Sunburn Control in Tomatoes



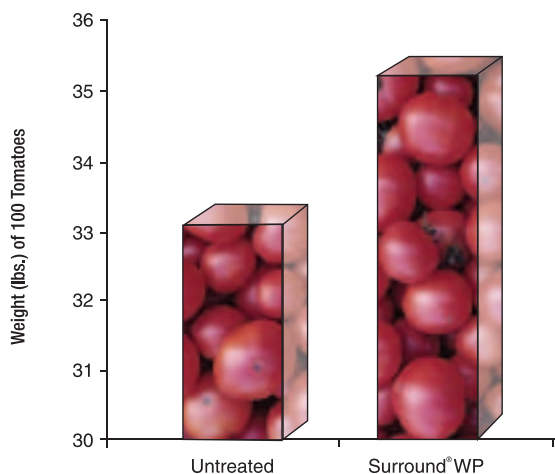
By reflecting the damaging heat and radiation of the sun, Surround[®] reduces sunburn significantly, resulting in higher yields of quality tomatoes. This study shows a 72 percent reduction of damage. (2001 season)

Engineered particles protect 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 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 affects fruit color, too, as lycopenes and carotenes are not synthesized above 86°F. High daytime temperatures can increase evaporation, resulting in high transpiration rates and poor water uptake, reducing 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, Surround reduced the temperature of treated tomato leaves by 9°F. Owing to the shape and size of its particles, Surround does not inhibit photosynthesis, so plant processes are improved. Local and international trials with Surround have shown increased tomato weight and yield.

Improved Tomato Weights



When applied to crops before severe sunburn conditions begin, Surround® has been shown to significantly increase tomato yield. (2003 season)

Sophisticated science

The advanced particle film technology behind Surround crop protectant was co-developed by the U.S. Department of Agriculture (USDA) and Engelhard Corporation, the world leader in surface and materials science. Based on kaolin—a naturally occurring, inert white mineral used in food and toothpaste—Surround particles are engineered to reflect the sun’s heat and radiation. The convenient WP formulation provides:

- Easy mixability in water
- Good coverage capacity
- Controlled adhesion to the fruit

Offering all these qualities, Surround represents a real breakthrough in plant surface protection.

Engelhard Corporation

101 Wood Avenue
P.O. Box 770
Iselin, NJ 08830-0770 USA
www.engelhard.com/surround

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 particularly important if the foliage is diseased and canopy cover is thereby reduced.

For either use, start applications before heat events occur and build multiple layers with successive applications. A visual inspection of film deposition and coverage is essential to fine-tune spray coverage.

For best results, follow all label directions.

Cut pinworm populations, too

As part of a planned Plant Surface Protection program, Surround offers the added benefit of insect suppression. Applications of Surround at sufficient rates to cover the canopy have been shown to reduce tomato pinworm damage by 75 percent.



Well-coated fruit

Fruit needing respray

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 WP treated produce is acceptable for processing.

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

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Change the nature of things.

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