

# Surround<sup>®</sup>

Crop Protectant

## New Study Provides Insight Into the Cause of Sunburn in Plants

Recent research into the causes of sunburn in fruit concludes that sunburn is caused not by a single wavelength of light, but rather by a combination of ultraviolet, visible and infrared radiation (heat) reaching the plant surface.

A new study comparing the ability of various sunburn protection products to reflect each of the three forms of incoming radiation shows that Surround is far superior at reflecting UVA, UVB and near-infrared radiation than the other tested horticultural sunburn protection products. The research also reveals Surround is superior at reflecting visible radiation, which is proven to be a factor in sunburn damage in plants.

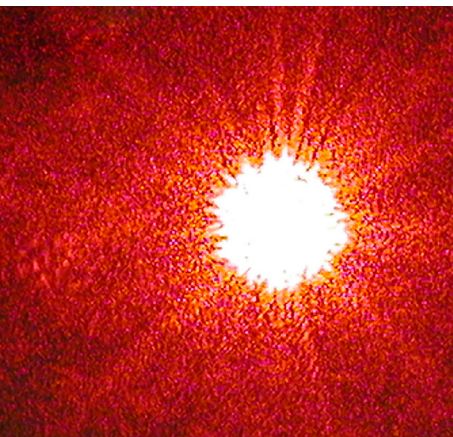
Independent researchers compared the amount of each type of radiation passing through a Surround film against films of other sunburn protectant products. In addition, the laboratory study found that among the tested sunburn protection products, Surround prevented the most incoming radiation of all three wavelengths from reaching the surface below, even under comparatively light depositions. At the same time, studies have shown that Surround does not inhibit the ability of water and carbon dioxide to pass through the film.

### Study Design

Researchers prepared films with Surround and three other sunburn protection products on glass slides at comparable label rates using a sprayer to develop a light, medium and heavy product deposition. For each level of deposition, the weight and the amount of reflected and transmitted UVB, UVA, visible and near infrared radiation (NIR) were measured. All products were applied so there was neither drip nor runoff. Reflectance and transmission were measured for UVB (290-320 nm), UVA (320-400 nm), visible (400-700 nm) and near infrared (700-1000 nm) radiation. Three replicates of product films were prepared and measured for reflectance and transmission.

### Results

In each replicate, researchers found that the low use rate of Surround (3 percent) prevents more than twice the level of UVB radiation; three times the level of UVA radiation; and five times the level of near infrared radiation from reaching plant surfaces compared to similar label rate applications of Cocoon<sup>®</sup>, Parasol<sup>®</sup> and Purshade<sup>™</sup> at use rates of 2 to 3 percent.



*A beam of light is refracted through a glass slide sprayed with Surround.*

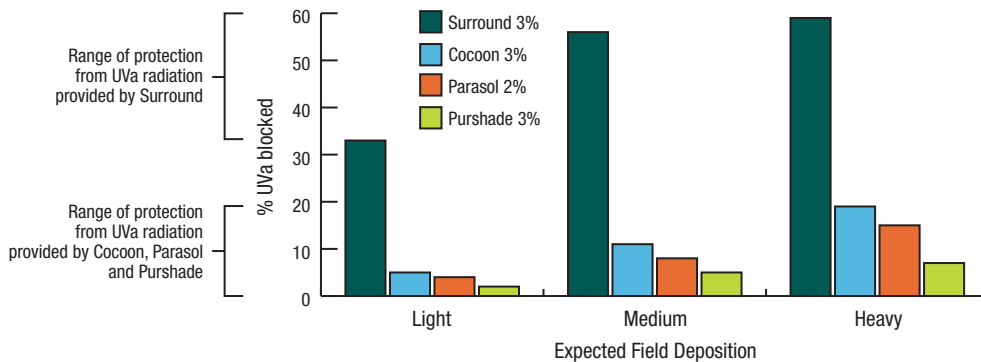
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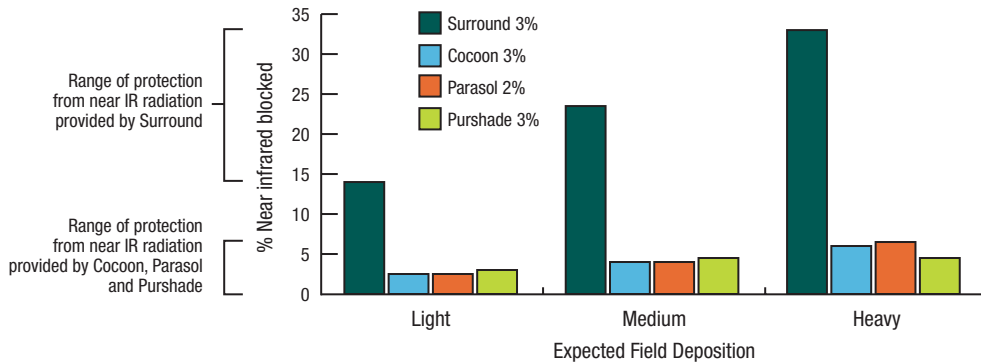
## A Comparison of Protection From UVA Radiation

A light deposition of Surround is far more effective reflecting UVA radiation than even heavy applications of Cocoon, Parasol or Purshade



## A Comparison of Protection From Near Infrared Radiation (Heat)

A light deposition of Surround is far more effective reflecting and blocking near infrared radiation (heat) than even heavy applications of Cocoon, Parasol or Purshade



## SPF (Skin Protection Factor)

**Not a proven measurement for sunburn protection in plants.**

Several sunburn products on the market make claims regarding SPF ratings. SPF is a multiple for determining how long a product will protect human skin from burning in comparison to leaving the skin untreated. SPF only measures the level of protection against UVb rays, which have proven harmful to human skin. Because research shows that plant sunburn is caused by a combination of UV (a & b), visible and infrared radiation reaching plant surfaces, the SPF factor rating is not a viable measurement of sunburn protection in horticultural applications.

For more information on Surround, please visit [www.novasource.com](http://www.novasource.com).

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

The use of Surround 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.

Surround is a registered trademark of Tessenderlo Kerley, Inc. Cocoon is a registered trademark of Advan LLC, Parasol is a registered trademark of Crop Care Australasia, and Purshade is a trademark of Purfresh, Inc.