

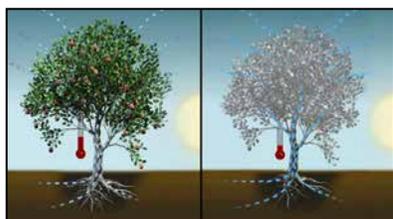
Surround[®]

Agricultural Crop Protectant



SURROUND improves the microclimate in which coffee can thrive, helping the plants produce closer to their optimal output.

Photo courtesy of Andrea Bermúdez Mena



Watch SURROUND videos at novasource.com.

Protecting Coffee Trees from UV Light and Heat Stress

Coffee is a well-known shade-loving plant. Though often grown in full sun, physiologically, the coffee plant produces at its optimum potential when grown in shade. Sunlight is essential for plant health, but excessive solar radiation can result in heat stress that reduces productivity. In multiple trials conducted in various coffee-growing regions, areas treated with Surround[®] Crop Protectant significantly out-produced untreated coffee trees grown either in full sun or in traditional shade.

The Science of Providing *Sprayable Shade* – Increasing Photosynthesis and Yields

SURROUND was co-developed with scientists at the U.S. Department of Agriculture (USDA). The highly engineered, patented kaolin particles in SURROUND reflect excessive infrared and ultraviolet radiation from the plant canopy. Many studies have shown SURROUND performs as sprayable shade – increasing photosynthesis in a variety of plants by reducing plant temperature and minimizing adverse effects of solar radiation. Enhancing photosynthesis results in increased plant vigor, growth, and yield. This is especially true of shade plants like coffee.

SURROUND is a USEPA and EU registered crop protectant and is certified for use in organic agriculture. Its use on coffee, produced for export, creates no tolerance complications.

Field Trials

Steiman, Bittenbender, and Idol (*J. Amer. Soc. Hort. Sci.* 42 (7): 1605 – 1608. 2007) showed that applications of SURROUND to full sun coffee in Hawaii lowered leaf temperatures an average of 3.4 degrees C. Photosynthesis was increased 71% compared to full sun plants because in late morning, as temperatures rose, untreated plants experienced rapidly declining photosynthesis rates while SURROUND-treated plants maintained high rates of photosynthesis. Yields increased 14% the first year and 99% the second year of continuous applications (Table 1).

Table 1. Field Trial Results Steiman, Bittenbender, and Idol (*J. Amer. Soc. Hort. Sci.* 42 (7): 1605 – 1608. 2007)

Location	Kunia, Oahu Island, Hawaii	
Protocol	SURROUND at 6% wt/vol (approximately 26.7 pounds per acre = 30 kilograms per hectare) in 53.5 gallons of water per acre (500 liters/hectare) @ 2 sprays per month.	Untreated: full sun
Result 1	Leaf Surface Temperatures 6.1° F (3.4° C) cooler	
Result 2	Photosynthesis 71% greater	
Result 3	Yield 14% greater in first year and 99% greater in second year	

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SURROUND also increases yields in coffee grown under traditional shade. In a multi-year trial in Costa Rica, bean weight increased by 70% following monthly applications of SURROUND, while a single application resulted in a bean weight (kg) increase of 36%.

Table 2: Multi-year Trial in Finca SAC, Alajuela, Costa Rica Shows Increasing Cumulative Effect with as Few as One Application per Year

Multi-year Trial in Finca, SAC, Alajuela, Costa Rica Shows Increasing Cumulative Effect with as Few as One Application per Year				
	2012-2013 Yield		2013-2014 Yield	
	kg/ha	% Increase	kg/ha	% Increase
T1. Untreated	7,774		15,306	
T2. SURROUND 4-5 applications (bi-monthly March-Sept)	9,674	24%	35,472	132%
T3. SURROUND 1 application (March)	8,006	3%	32,556	113%

- Full shade plantation under pines and eucalyptus
- Three year consecutive SURROUND treatments of same plants
- T2: 5% SURROUND in 200 L/ha, T3: SURROUND in 200 L/ha (plus conventional program)

Guidelines for Protecting Coffee Plants from Sunburn and Heat Stress

- **Concentration/Rate:** For monthly applications use 5% – 10 kilograms in 200 liters of water per hectare (10 kg/200L water/ha). For a single use at the beginning of the dry season, use 10% – 20 kilograms in 200 liters of water per hectare (20 kg/200L water /ha). If trees are large, requiring more spray volume, maintain these concentration percentages.
- **Timing:** Make initial application at the beginning of the dry season. Use a full rate and ensure total canopy coverage.
- **Reapply** during the season, as necessary, to maintain the visibly white coverage.
- **Mode of Application:** Back pack sprayer, motorized sprayer, or aircraft aerial sprayer. Calibrate sprayer and spray according to standard coffee spray program volume.
- **Tank Mixing:** SURROUND may be mixed and applied with fungicides, insecticides, and foliar fertilizers because it is chemically and toxicologically inert. However, as a precaution, prior to tank mixing, conduct a small jar test for signs of physical incompatibility.

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

CONDITIONS OF SALE – LIMITED WARRANTY AND LIMITATIONS OF LIABILITY AND REMEDIES

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SURROUND_PL_Coffee Plant Health & Yield_06/2015



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