Mitigate fruit sunburn with Parka®



Fruit Sunburn

Sunburn damage is caused by photo-oxidative stress in chlorophyll containing tissue when fruits are exposed to high solar radiation and elevated temperatures (Morales-Quintana et al, 2020). When light energy absorbed by the tissue exceeds its photosynthetic capacity, reactive oxygen species (ROS) can develop, causing photo-oxidation which results in the sunburn symptoms. Furthermore, high temperatures decrease the time needed to induce sunburn damage and the temperature threshold varies with cultivar (Morales-Quintana et al, 2020).

Apple is one of the major fruits impacted by sunburn. Depending on temperature and solar radiation, apple sunburn damage can be classified into three types:

• Sunburn necrosis: Fruit tissue dies due to excessive heat when the temperature of the fruit surface is greater than 126°F (52°C). This can happen even when the ambient

temperature is only 90°F (32°C) since the fruit surface can be up to 30°F hotter than the air.

- Sunburn browning: The most prevalent and costly type of sunburn. It causes cell membrane degradation, and it is a function of both light and temperature. It occurs when the fruit surface temperature is between 114°F–120°F (46°C–49°C) and is exposed to UV radiation for approximately one hour. The degradation can continue through post-harvest storage causing "storage" sunburn which can lead to costly downgrading of the fruit.
- Photo-oxidative sunburn: Occurs when fruit that has not been acclimatized to intense radiation is suddenly exposed to intense light. This type of damage can occur at low temperatures, and it is expressed as bleached spots that turn dark over time.

(Source: http://treefruit.wsu.edu/article/apple-sunburn-101/)







Parka® for Sunburn Prevention

Parka[®] provides sunburn protection to the fruit by supplementing the cuticle of the fruit and leaf with a clear, hydrophobic, and elastic lipid bilayer that expands as they develop. Parka[®] reduces sunburn incidence and increases stress tolerance. This occurs as the result of enhancing the plant's antioxidant capacity by increasing anthocyanin concentration as well as increasing key components of the photosynthetically active tissue like chlorphyll and pheophythin. This allows the plant to utilize the excess light energy for photosynthesis, rather than allowing the development of photo-oxidative species that cause sunburn damage, therefore presenting a higher photosynthetic efficiency compared to untreated fruit (Figure 1).



Photochemical Efficiency of the PS-II Complex in Apples

1st Application 2nd Application 3rd Application 4th Product Rate Application Parka 1 gal/ac PF+5-10 days +30 days +30 days Kaolin + Terpenoids 10lbs/ac PF+5-10 days +35-40 days +30 days +30 days

Figure 1. Photosynthentic efficiency of two apple varites treated with Parka[®] and a Kaolin-based product. (Source: University of Concepcion, Chile, 2018)

Parka[®] on Apples

Cultiva[®] has conducted several studies on apples to reduce sunburn and improve overall fruit quality. Here are the major benefits of Parka[®] on apples:

- Proven to reduce sunburn damage by up to 42% over control (Figure 2).
- Increases fruit quality.
- Increases plant tolerance to environmental extremes.
- Easily tank mixed with foliar nutrients and pesticides.
- Leaves no visible residue.
- Exempt from maximum residue levels.
- No preharvest interval, No worker reentry interval.

Average Sunburn in Apples – 18 trials



Figure 2. Average results of Parka® to mitigate sunburn on apples. (Source: Internal data compiled from 18 trials between 2016 and 2021)

Parka[®] Program for Apples

For sunburn control apply 1 gal of Parka® per acre when fruit is 12-15 mm in size. Reapply as needed every 21–30 days for a minimum of 4 applications per season. For fruit finish improvement start application at fruit set.

References

Morales-Quintana, L., et al. 2020. Sun injury on apple fruit: Physiological, biochemical and molecular advances, and future challenges. Scientia Horticulture.



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