

## LED Interlighting for greenhouse tomato cultivation in Italy: first results and application potentialities

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Recently, light-emitting diodes (LEDs) have experienced a wide increase in Northern Europe protected horticulture, enabling to enhance plant growth under controlled environmental facilities. The lack of a proper supply of sunlight can be a drawback which can lead to a decrease in plant yield. However, supplemental LED interlighting can prevent light shortage by providing plants with the needed radiative fluxes. This study evaluates the feasibility of optimized supplemental lighting technology for tomato crop production in Italy. Effects of supplemental LED interlighting on vegetative growth, fruit growth, yield, fruit quality and physiological traits of high-wire tomato plants (*Solanum lycopersicum* 'Siranzo') during spring and summer season were addressed. Plants were either grown under natural solar radiation (control), or by adding supplemental LED interlighting treatment consisting on red (R) and blue (B) light (RB ratio of 3). Interlighting lamps were placed at 2 m height within the canopy supplying a photosynthetic photon flux density of 170  $\mu\text{mol m}^{-2} \text{s}^{-1}$  for 16 hours per day. Supplemental LED interlighting enhanced yield in spring (+24%) and summer (+13%) as a result of increased fruit weight and dimension. While no effects on soluble solids content and fruit color at harvesting were observed, supplemental LED interlighting accelerated ripening by one week in spring and two weeks in summer. Moreover, weekly measurements highlighted greater vegetative and fruit growth when supplementary lighting was provided. The research explores the sustainability of supplemental LED interlighting in Italian high-tech greenhouse tomato production.

The research was performed within the framework of the project "Light on Shelf Life" (J56J20000410008) funded by the Italian Ministry of Agricultural, Food and Forestry Policies (MIPAAF) within the call "Fondo per il finanziamento di progetti innovativi, anche relativi alla ricerca e allo sviluppo tecnologico nel campo della shelf life dei prodotti alimentari e del confezionamento dei medesimi, finalizzati alla limitazione degli sprechi e all'impiego delle eccedenze".

**Keywords:** *Solanum lycopersicum*; Light Emitting Diodes (LEDs); supplemental interlighting, yield, greenhouse cultivation.