

## Does supplemental LED lighting effectively enhance quali-quantitative traits of greenhouse grown truss-tomato? A meta-analysis

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Greenhouse-grown truss-tomato (*Solanum lycopersicum*) is characterized by long stems usually trained in high-wire systems, which apply high plant density to increase cultivation performances. However, these intensive growing systems, together with light interception of greenhouse cladding materials and climatic characteristics (e.g., cloudy days, high latitude), may determine intracanopy mutual shadings and sub-optimal lighting conditions. In this context, artificial supplemental lighting may represent an opportunity to improve quantitative and qualitative aspects of production, especially if performed with highly efficient light emitting diodes (LEDs). A wide number of studies investigating the topic are available in literature. However, research results are often diversified as a consequence of variable lighting, environmental and cultivation conditions among performed experiments. The hereby research presents a meta-analysis with the aim to answer the following research question: does supplemental LED enhance yield and qualitative aspects of greenhouse-grown truss tomato? The study was based on a literature review of 31 published papers and 100 total observations analysed by the difference among independent groups. Results showed a significant positive effect of supplemental LEDs lighting enhancing yield (+40%), fruit soluble solids (+6%) and ascorbic acid (+11%) contents, leaf chlorophyll content (+31%), photosynthetic capacity (+50%) and leaf area (+9%) as compared to control conditions, while not significant alterations were observed for stomatal conductance.

**Keywords:** supplemental lighting, light emitting diode, greenhouse, *Solanum lycopersicum*, interlighting.