
Effect of light spectrum from Light Emitting Diode (LED) on postharvest fruit quality of Tomato (*Solanum lycopersicum* L.)

G.P.M.S. Nandasena and P.K. Dissanayake*

Department of Export Agriculture, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka

Abstract

Tomato (*Solanum lycopersicum* L.) is one of the higher-ranking commercial vegetable crops in the World. This study was to investigate the effect of different colours such as blue, red, yellow, green, and white light of LED lighting and dark condition (control) on postharvest quality and microbial growth on harvested tomato fruits. Experiment was conducted in complete Randomized Design in laboratory providing lighting with light intensity of 5555.5-8333.3 lux/m² in 30 cm x 22 cm x 30 cm cardboard boxes with temperature range of 25 °C-28 °C and relative humidity of 80%. Fruit quality parameters were studied such as fresh weight loss, pH, total soluble solid (TSS), hardness, lycopene, total carotene, ascorbic acid and *in vitro* microbial growth under different colours of LED light. At the 25th day of storage, fresh weight loss % significantly high in blue LED light (11.08±1.141%) and the lowest value was recorded in control (6.20±1.41%). At 9th day L* value significantly high under the control (58.01±1.849) than other treatments. L* value significantly high under the white LED light in 17th (52.42±1.10) and 19th (49.08±1.7) days than others. a* and b* values of colour, hardness and pH were not significantly varied under the LED lights and control throughout the storage. On 25th day the highest TSS was recorded (4.50± 0.52%) in blue LED light whereas, the lowest TSS was recorded in white (3.5±0.52%). The highest lycopene content was recorded in red LED light in 21th (178.56±3.59 mg/kg) and 25th (237.35±22.8 mg/kg) days. The lowest Lycopene content recorded in green LED light in 21th (65.373± 3.59 mg/kg) and 25th (90.53±22.8 mg/kg) days. At 21st day the highest carotene content was recorded in red LED light (0.3461±0.0047 mg/kg). The lowest carotene content was recorded in green light treatment (0.1274±0.047 mg/kg). 1st (0.177±0.048cm) and 2nd (0.333±0.074cm) days after inoculating the highest *in vitro* microbial colony growth was recorded in control and there was no *in vitro* microbe colony growth in LED light treatments in 1st and 2nd days. LED light colour mainly red, white, and blue considerably effect on postharvest fruit quality of tomato such as fresh weight loss %, lycopene content, total solid content (TSS), and total carotene. LED light spectrum effectively suppressed microbial growth on fruit surface especially red light which evident by delaying of microbial growth in *in vitro* microbial study.

Keywords: Fresh weight loss, *In vitro* microbial growth, Lycopene, Total carotene, Total Soluble Solid

*Corresponding Author: kapila@agri.sab.ac.lk