

1 Continuous light-emitting Diode (LED) lighting for improving food quality. 2016 Beijing Conference on
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5 **Abstract.** Lighting-emitting diodes (LEDs) have shown great potential for plant growth and development,
6 with higher luminous efficiency and positive impact compared with other artificial lighting. The combined
7 effects of red /blue or/and green, and white LED light on plant growth and physiology, including
8 chlorophyll fluorescence, nitrate content and phytochemical concentration before harvest, were investigated.
9 The results showed that continuous light (CL) exposure at pre-harvest can effectively reduce nitrate
10 accumulation and increase phytochemical concentrations in lettuce plants, and the former is dependent on
11 the spectral composition and continuous light duration. Lettuce plants grown under continuous combined
12 red and blue (with or without green) LED light with a photosynthetic photon flux density (PPFD) at 200 μ
13 mol m⁻² s⁻¹ exhibited a remarkable decrease of nitrate contents at 24 h compared to other light treatments.
14 In addition, red and blue light (R:B=4:1) was more effective in facilitating lettuce growth than white LED
15 light at the same PPFD. Moreover, continuous LED light for 24 h significantly enhanced the free-radical
16 scavenging activity and increased phenolic compound concentrations. In this study, we suggest that a
17 period of continuous LED (R/B) with green (G) light exposure is needed in order to decrease nitrate
18 concentrations and enhance lettuce quality. 24 h appears to be the best, but this period should not exceed 48
19 h. It appears that continuous light could enhance the activity of nitrate reductase leading to a low level of
20 nitrate content in the leaf. However, the reduction of nitrate is considered to be associated with the
21 circadian clock and the light-signaling pathway as well.