THE EFFECT OF BLUE LIGHT DOSAGE ON GROWTH AND ANTIOXIDANT PROPERTIES OF *BRASSICACEAE* MICROGREENS

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Abstract. *Light-emitting diodes (LEDs) are an efficient light source for plant growth and development, and can be easily controlled in artificial growing environments. The impact of blue LED light intensity on plant growth parameters and antioxidant capacity of red pak choi (Brassica rapa var. chinensis 'Rubi F_1'), tatsoi (Brassica rapa var. rosularis) and mustard (Brassica juncea L. 'Red Lion') microgreens were investigated. Plants were cultivated within 16-h photoperiod, 21±2/ 17±2 ºC (day/night), 50-60 % relative humidity in growth chamber for 10 days after sowing. Total photosynthetic photon flux density (PPFD) was ~300 µmol m^{-2} s^{-1}. Five dosages of blue (447 nm; 0, 25, 50, 75, 100 µmol m^{-2} s^{-1}) in combination with red (638 nm; 665 nm) and far red (731 nm) LEDs were tested. Results showed that microgreens treated without blue light were significantly elongated than plants treated with ~50-75 µmol m^{-2} s^{-1} blue light dosages. The effect of blue light on antioxidant properties differed depending on microgreens species. The small addition (~25 µmol m^{-2} s^{-1}) of blue light was more suitable for higher contents of total phenols in mustard and red pak choi microgreens, and ascorbic acid synthesis in tatsoi. The ~75 µmol m^{-2} s^{-1} blue light dosage resulted in significantly higher DPPH free radical – scavenging activity and total anthocyanins contents in red pak choi and tatsoi microgreens, respectively. The highest blue light dosage (~100 µmol m^{-2} s^{-1}) led to significantly increased accumulation of total phenols in tatsoi. These results showed that supplemental blue light can be strategically used to enhance the nutritional value and inhibit elongation of microgreens. Targeted management of the blue light irradiance in combination with other LEDs may lead to maximized plant production and nutritional quality of young green vegetables grown in controlled environments.*

Key words: *light- emitting diodes, blue light, microgreens, controlled environment, antioxidants.*

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