

ABSTRACT

Indonesia, as a producer of tropical fruits, has great potential in the horticultural sector, including watermelons, which have high production rates and generate large amounts of peel waste. Watermelon rinds, rich in cellulose, hemicellulose, and lignin, are utilized as precursors for the synthesis of Carbon Quantum Dots (CQDs) via the hydrothermal method with variations in temperature, followed by characterization using UV lamp, PL, FTIR, and PSA. The best CQDs were produced at 200°C for 12 hours, with an average size of 7.13 nm, zeta potential of -14.91 mV, and functional groups including hydroxyl, C-H, C=O, C=C, C-O, and ether. These CQDs were applied as additional fertilizer to hydroponic wick-grown bok choy plants at concentrations of 100, 150, and 200 ppm, with a control group without CQDs. The results showed that the addition of CQDs, particularly at 150 ppm, provided the best morphological growth and the highest chlorophyll content (25×10^{-4} mg/mL), thereby potentially enhancing the growth and photosynthetic activity of bok choy.

Keywords: *Bok choy, carbon quantum dots, hydroponic, hydrothermal, watermelon rind*