

The Effect of the Wavelength of the LED used to Pump Phosphor Produced from Curcuminoids Dye Extracted from Turmeric (*Curcuma longa L.*) to Produce White Light

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Abstract. Previous studies have investigated the use of curcuminoids dye extracted from turmeric (*Curcuma longa L.*) for light down-conversion of UV light (390 nm) for application as white light emitting diode (WLED) as well as the three methods used to extract curcuminoids dye (the normal method, use of Soxhlet apparatus and by combining the normal method with the Soxhlet extraction). This paper goes a step further to analyze the effect of the wavelengths of LED sources (365, 390 and 445nm) used to pump phosphor in the conversion of white light. The chromaticity coordinates (CIE), color rendering index (CRI) and color temperature (CCT) were measured for different applied currents (20, 60 and 100mA) and weights of curcuminoids (5, 10, 15, 20, 25, 30, 35, 40, 45, 50 and 55mg). With optimum CRI, CIE and CCT values of 73.9, 0.3304;0.3501, and 5579K, respectively, the samples pumped with LED source of 365 nm wavelength produced better white light compared to 390 and 445 nm, in terms of the amount of phosphor used. Thus, the wavelength of the LED source used to pump phosphor is inversely related to the amount of yellow light produced into the blue light when the concentration of phosphor is constant. The stress test showed that the degradation time of the dye could be improved by reducing the wavelength used to pump the sample or selecting a weak thermal conductivity material.