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[4-1330-A-03] **Green Synthesis of Zinc Oxide Nanoparticles from Asiatic Pennywort (*Centella asiatica* L.) and Its Effect on the Rice Starch-Gelatin Composite Film**

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Keywords: *Centella asiatica* (L.), Zinc oxide nanoparticles, Gelatin, Rice starch, Antimicrobial activity

Asiatic pennywort (*Centella asiatica* L.) is a plant that is abundantly available in Thailand. The *Centella asiatica* leaf extract (CAE) is known to possess antioxidant and antimicrobial properties as it contains polyphenols. This allows CAE to act as a reducing agent for a green synthesis of zinc oxide nanoparticles (ZnONPs). The ZnONPs provides a good antimicrobial activity, especially to bio-based packaging films. Therefore, in the objectives of this study were (i) to synthesize the ZnONPs using the CAE and (ii) to investigate the effects of the ZnONPs incorporation on the physicochemical, thermal, and antimicrobial properties of the rice starch-gelatin composite film. Briefly, ZnONPs were synthesis through the green method using CAE. The shape and the size of the prepared ZnONPs were found to be the rod shape of 100-300 nm in length. The ZnONPs were then added into the rice starch-gelatin composite film at different concentrations (i.e., 0, 0.5, 1, 2, and 3%, w/v). As the ZnONPs increased, the thickness of the developed film with ZnONPs addition were found to increase (Approx. 50-70 mm). The tensile strength (TS) were also increased from 3.49 to 4.63 MPa as well as the increasing of the water vapor permeability. The thermal stability of the developed film was also increased. However, the addition of ZnONPs reduced the elongation at break (EAB) (92.20-37.68%) and the film solubility (67.84 - 30.36%). Furthermore, ZnONPs also altered the color, appearance, transmission, and transparency properties of the prepared films with the crystalline structure presented as confirmed by X-ray diffraction (XRD) analysis. The antimicrobial activity of the rice starch-gelatin film enriched with ZnONPs against Gram-positive bacteria (*S. aureus* and *B. cereus*), Gram-negative bacteria (*E. coli* and *S. Typhimurium*), and fungal (*A. niger* and *C. alatae*) by disc diffusion method were found to be higher as the ZnONPs concentration increased while the rice starch-gelatin film without ZnONPs did not show the inhibition zone. Thus, the developed rice starch-gelatin film with ZnONPs could potentially be used as an antimicrobial packaging film.