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Antimicrobial and Antioxidant Activity of Caffeic Acid Phenethyl Ester Nanoparticles

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Caffeic acid phenethyl ester was successfully prepared by rapid expansion of supercritical solutions into liquid solvent. An average size of these CAPE nanoparticles was characterized by TEM and DLS techniques. They were found that diameters CAPE-NPs were ˜40 to ˜400 nm. The minimum inhibitory concentrations (MICs) and the minimum bactericidal concentration (MBCs) of CAPE nanoparticles were compared to CAPE particles using the plate count method against *Bacillus cereus*, *Staphylococcus aureus*, *Listeria monocytogenes*, *Escherichia coli* and *Vibrio parahaemolyticus*. The antioxidant activities determined by the 2,2-diphenyl-1-picrylhydrazyl assay, ferric reducing antioxidant power assay and total phenolic content, respectively. MICs and MBCs of Gram-positive bacteria and Gram-negative bacteria were 350, 700 µg/mL and 1400 µg/mL. CAPE-NPs presented antioxidant activities similar to CAPE dissolved in 40 % ethanol but higher activities than that of CAPE in water. Antimicrobial and antioxidant properties of CAPE can be improved by a particle-size reduction in the ranges of nano-scale. In addition, the results should be generally applicable to nanoparticles fabrication to improve their bioavailability. As a powerful antimicrobial and antioxidant activities, CAPE nanoparticles could be a potentially promising application for active food packaging.

Keywords: Active packaging, Antimicrobial, Antioxidant, Caffeic acid phenethyl ester, Nanoparticles

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