

Figure S1. Bactericidal activity of nanocomposites and LPEV. Viability of *S. aureus* (ATCC 25923) after treatment with MZ, LPEV, and MZ-LPEV. The bacterial cultures are the same as those used for determining minimum inhibitory concentration (MIC) (Table 2), with 5 μL from each well being added to Luria-Bertani agar plates. The plates were further incubated at 37 $^{\circ}\text{C}$ for 16 h. The agar plate was imaged with ChemiDocTM MP (Bio-Rad, CA, USA) and ImageLabTM Software (ver 5.02, Bio-Rad, CA, USA). Experiments were performed in triplicate. A representative plate is shown here.

S. aureus
(ATCC 25923)

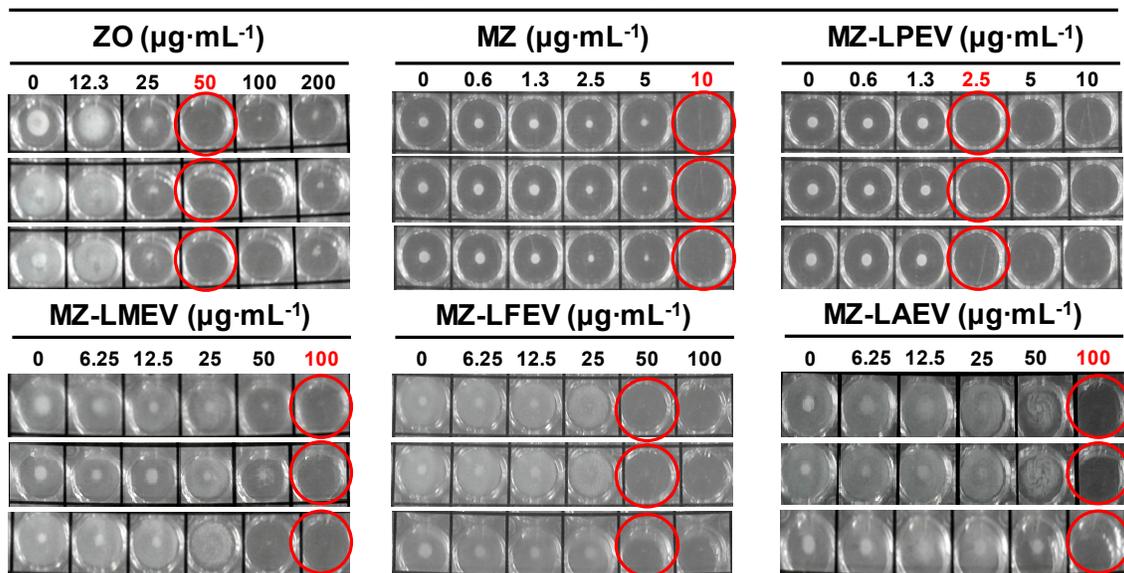


Figure S2. Antibacterial activity of nanomaterials. Data for determining minimum inhibitory concentrations (MICs) of ZO NP, MZ, and *Lactobacillus* strains-derived EV-coated MZ against *S. aureus* (ATCC 25923) are shown. Photographs of 96-well plates from triplicate experiments are shown. Red circles indicate the MIC values. The values are presented in **Table 2**.

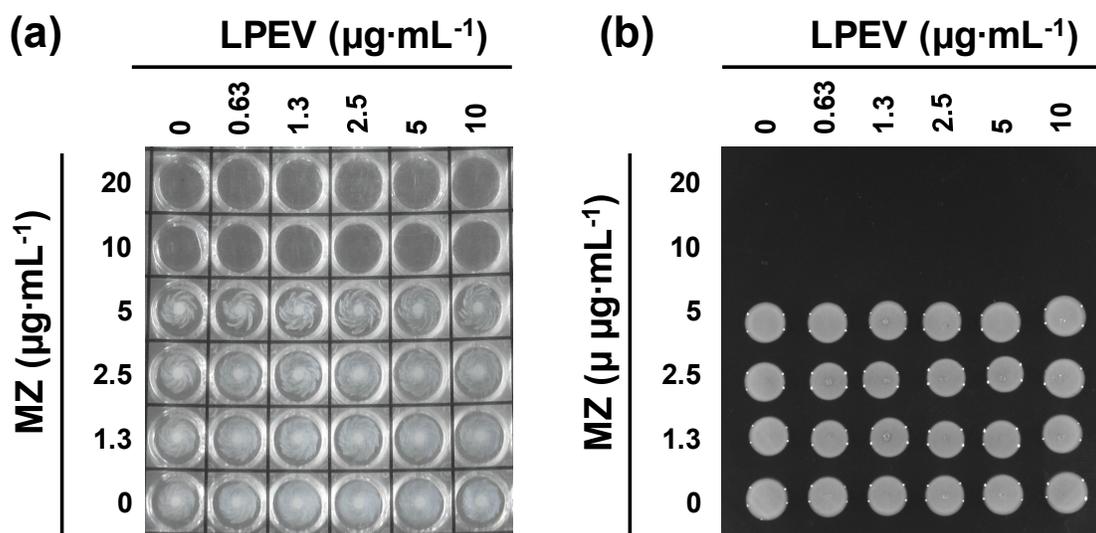


Figure S3. Evaluation of synergistic activity between MZ and LPEV. (a) Checkerboard assay. Result for *S. aureus* (ATCC 25923) was shown. **(b)** Viability assay. Aliquots of *S. aureus* (ATCC 25923) cells from (a) were spotted onto LB-agar plates and further incubated at 37 °C for 16 h. The agar plate was imaged with ChemiDoc™ MP (Bio-Rad, CA, USA) and ImageLab™ Software (ver 5.02, Bio-Rad, CA, USA). A representative replicate from triplicate experiments is shown.

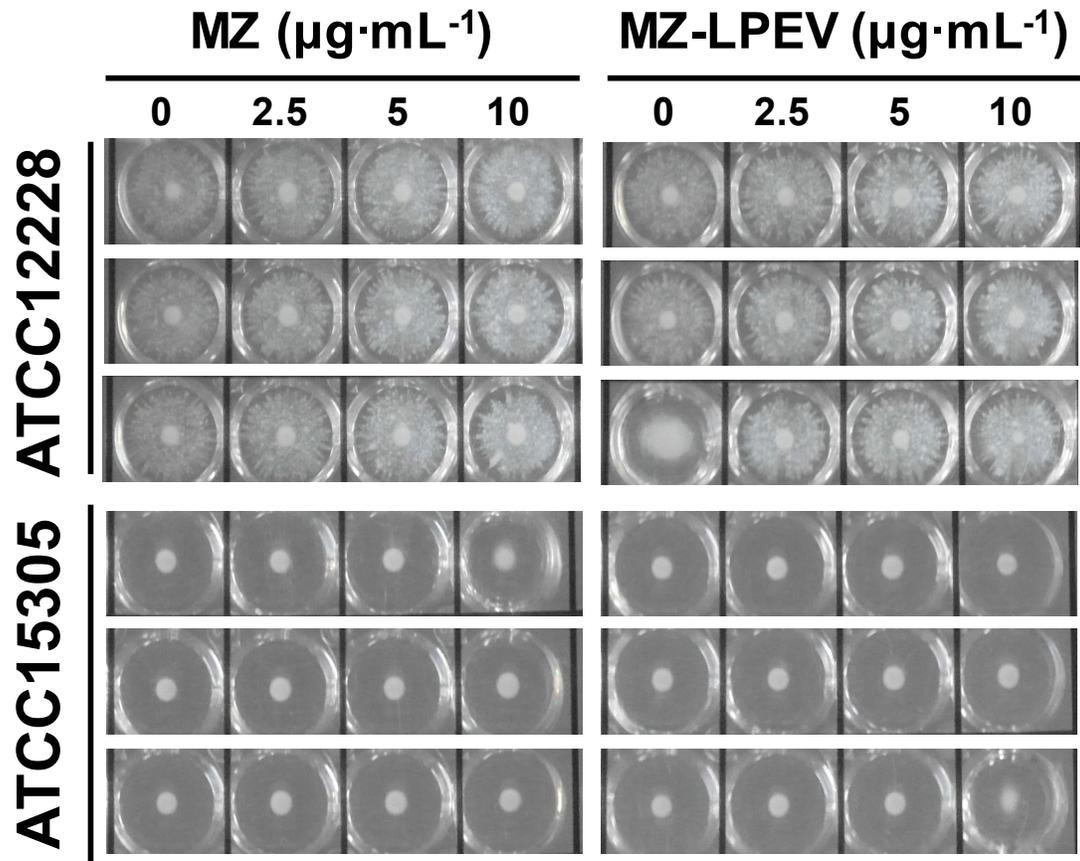


Figure S4. Antibacterial activity of nanocomposites and MZ-LPEV against Gram-positive bacteria. Minimum inhibitory concentrations (MICs) of MZ and MZ-LPEV against *S. epidermidis* (ATCC 12228) and *S. saprophyticus* (ATCC 15305). Results of MIC determination triplicate experiments in 96-well plates are shown.

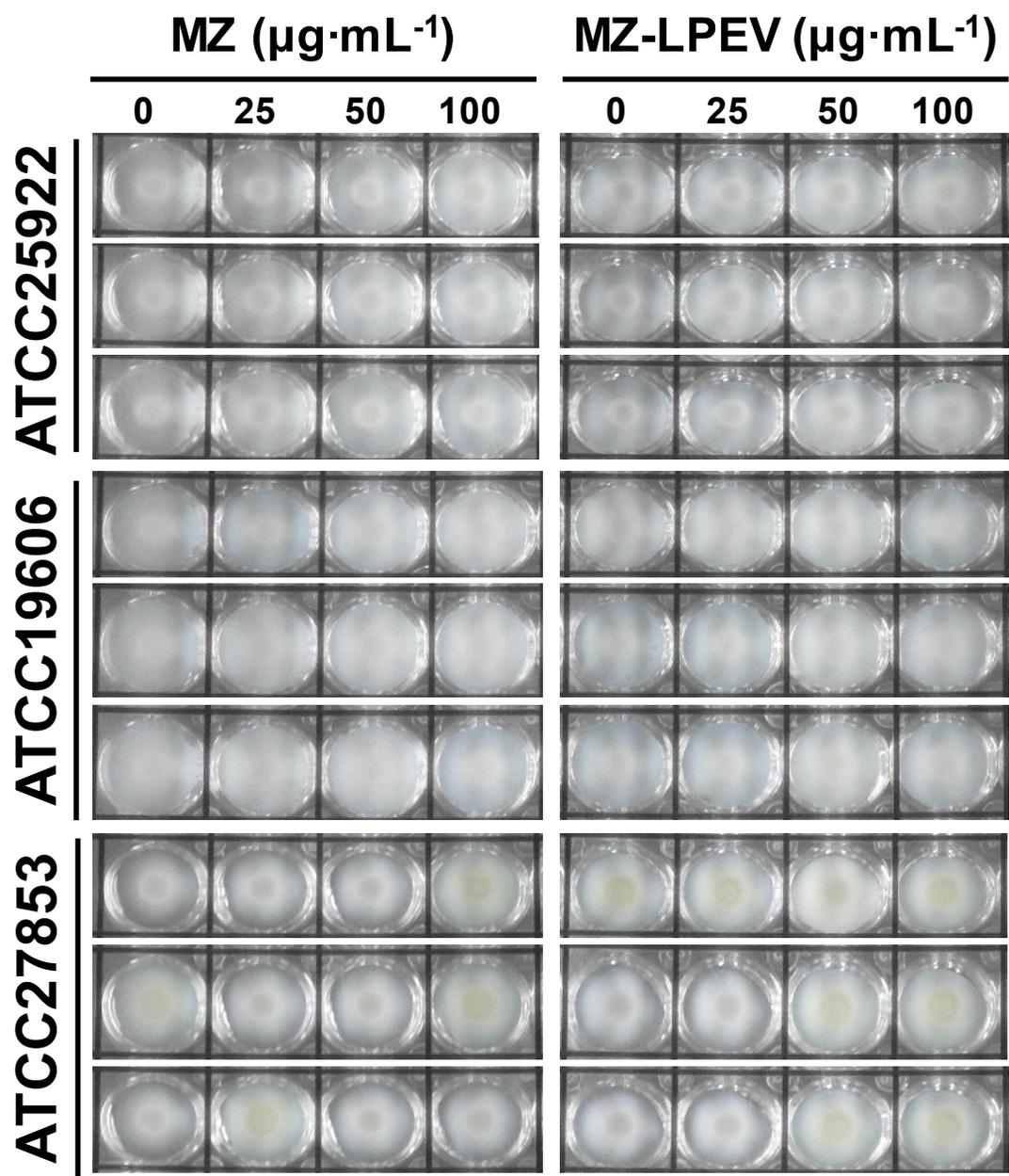


Figure S5. Antibacterial activity of nanocomposites and MZ-LPEV against Gram-negative bacteria. Minimum inhibitory concentrations (MICs) of MZ and MZ-LPEV against *A. baumannii* (ATCC 19606), *E. coli* (ATCC 25922), and *P. aeruginosa* (ATCC 27853). The images of MIC results in 96-well plates from triplicate experiments are shown.