Supporting Information

Self-assembled Lignin Nanoparticles produced from Elephant Grass Leaves enable Selective Inactivation of Gram-positive Microorganisms

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Supporting information contains 5 pages with 4 supplementary figures.

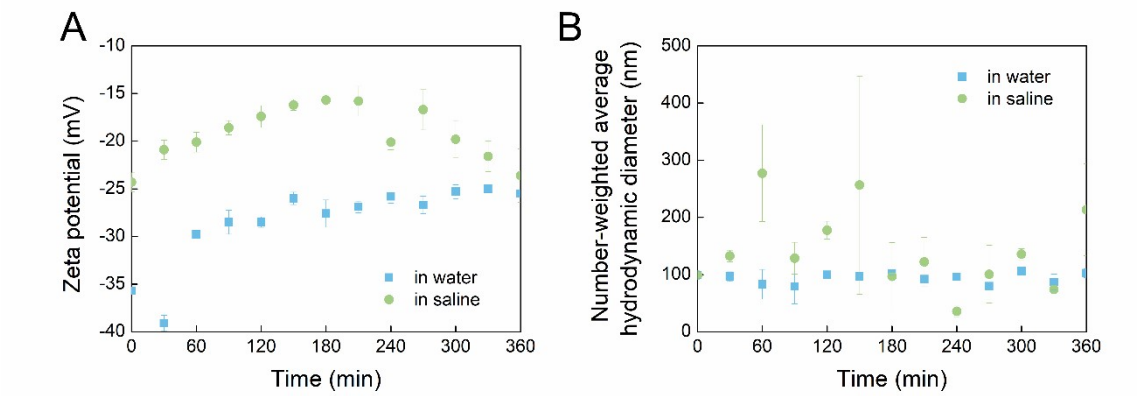

Figure S1. (A) Zeta potentials and (B) number-weighted average hydrodynamic diameters of SA-LNPs dispersed in deionized water or saline solution as a function of time. Measurements were taken over 6 h. Including all measurements, the mean zeta potentials were –28.5 ± 4.3 mV and –19.3 ± 2.9 mV, while the mean hydrodynamic diameters were 94 ± 9 nm and 142 ± 71 nm, respectively for SA-LNPs dispersed in water and saline.

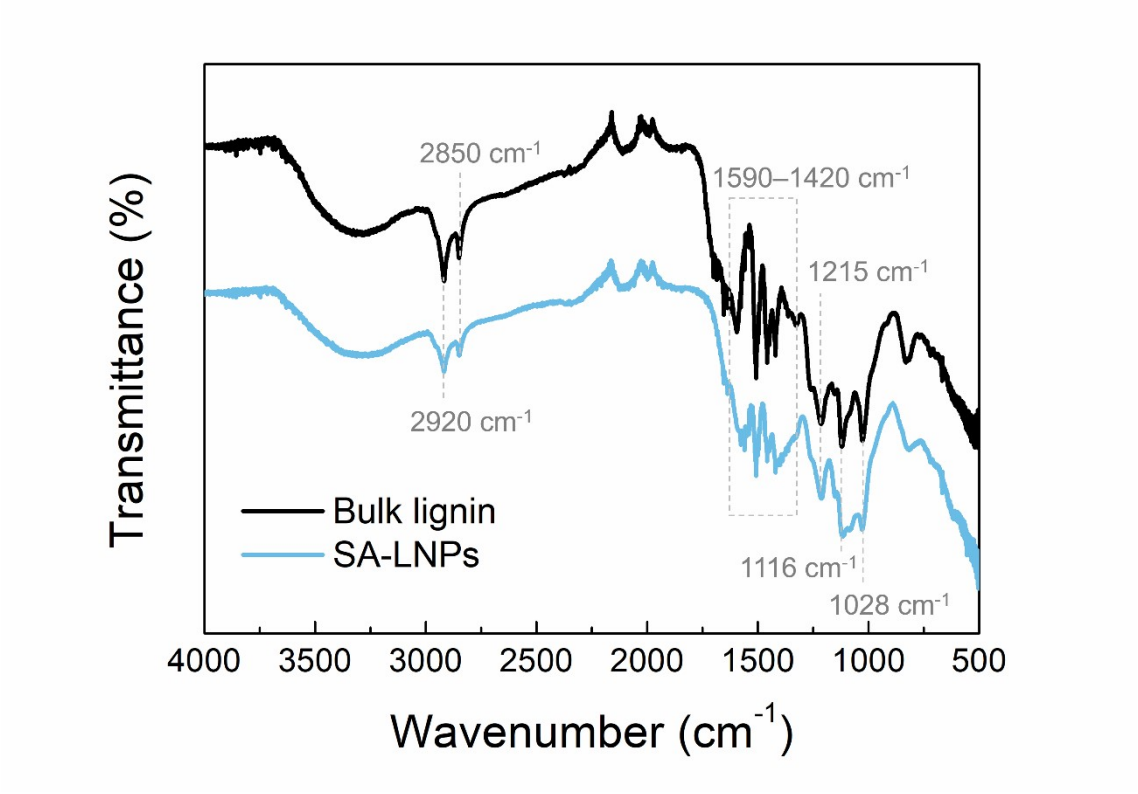

Figure S2. ATR-FTIR spectra of dried bulk alkaline lignin and SA-LNPs from elephant grass leaves. The absorption bands indicated by dotted lines are attributed to C–H stretching in methoxyl groups (2920 and 2850 cm^{-1}); C═C stretching in aromatic rings (1420 to 1590 cm^{-1}); C–O aryl-ether groups (1215 cm^{-1}), C═O stretching (1116 cm^{-1}), and aromatic C–H in-plane deformation (1028 cm^{-1}).

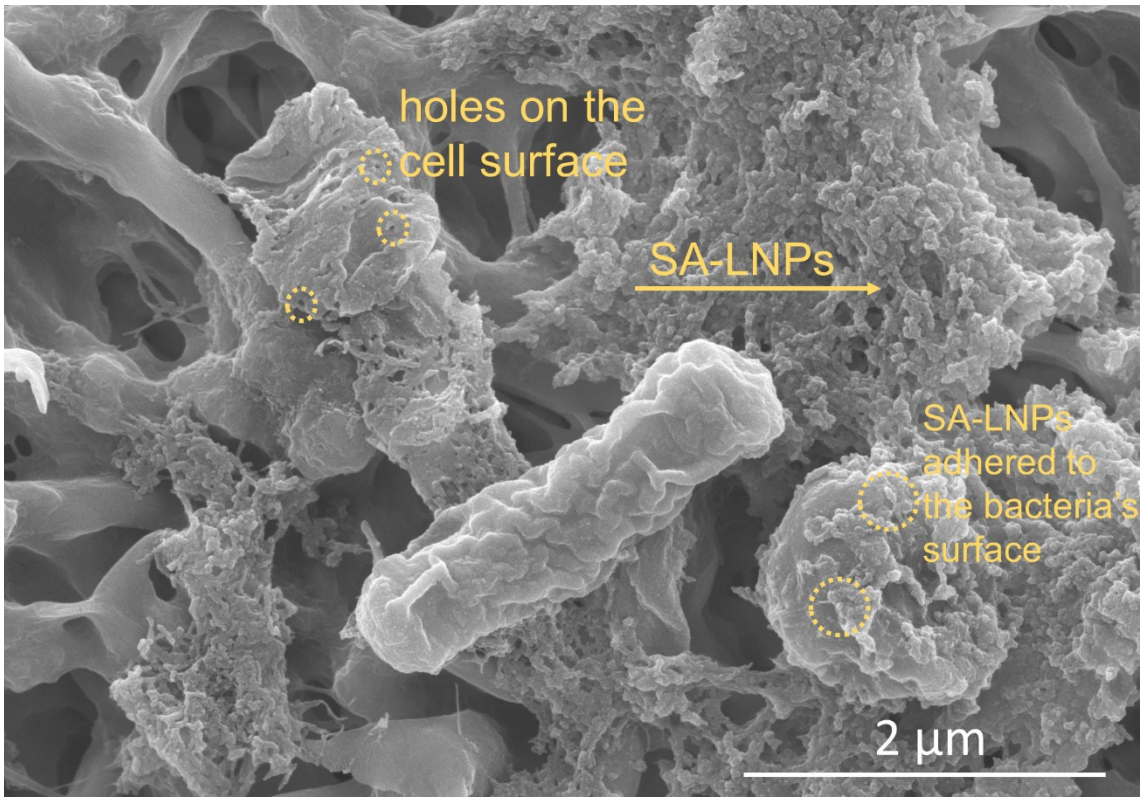

Figure S3: SEM image showing the formation of holes on the bacteria cell wall and adhesion of SA-LNPs on the surface of *L. fermentum* cells.

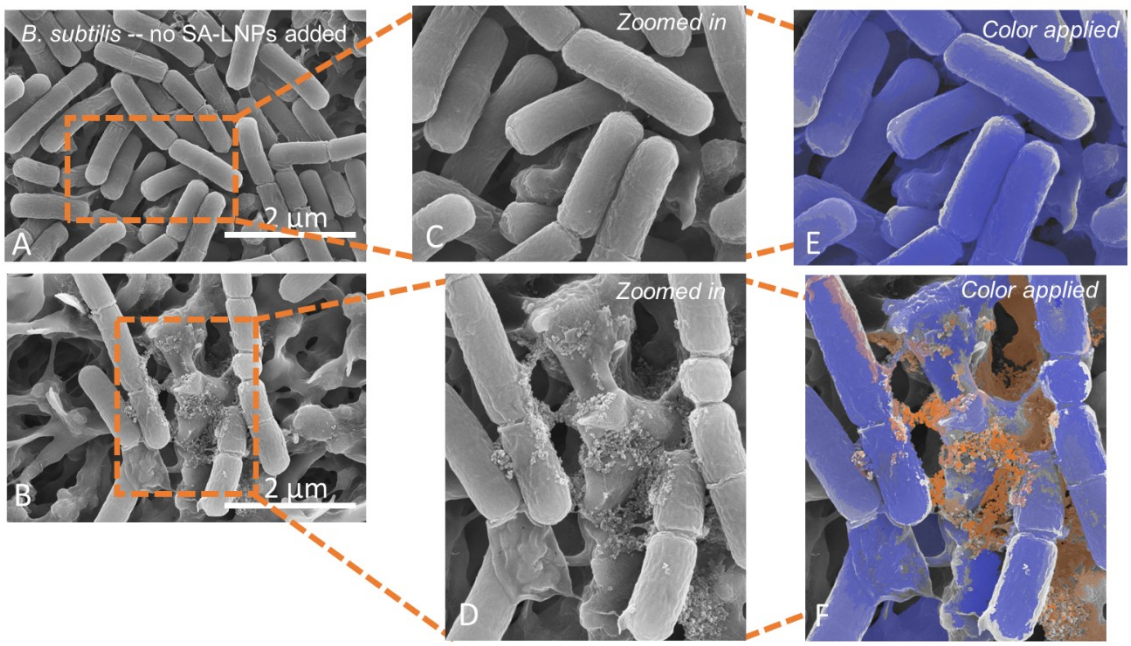

Figure S4: SEM images showing *B. subtilis* cells before (A) and after contact with SA-LNPs (B). Parts of the images were zoomed in (C and D) and color applied (E and F) to differentiate the cells in blue and the SA-LNPs in orange.

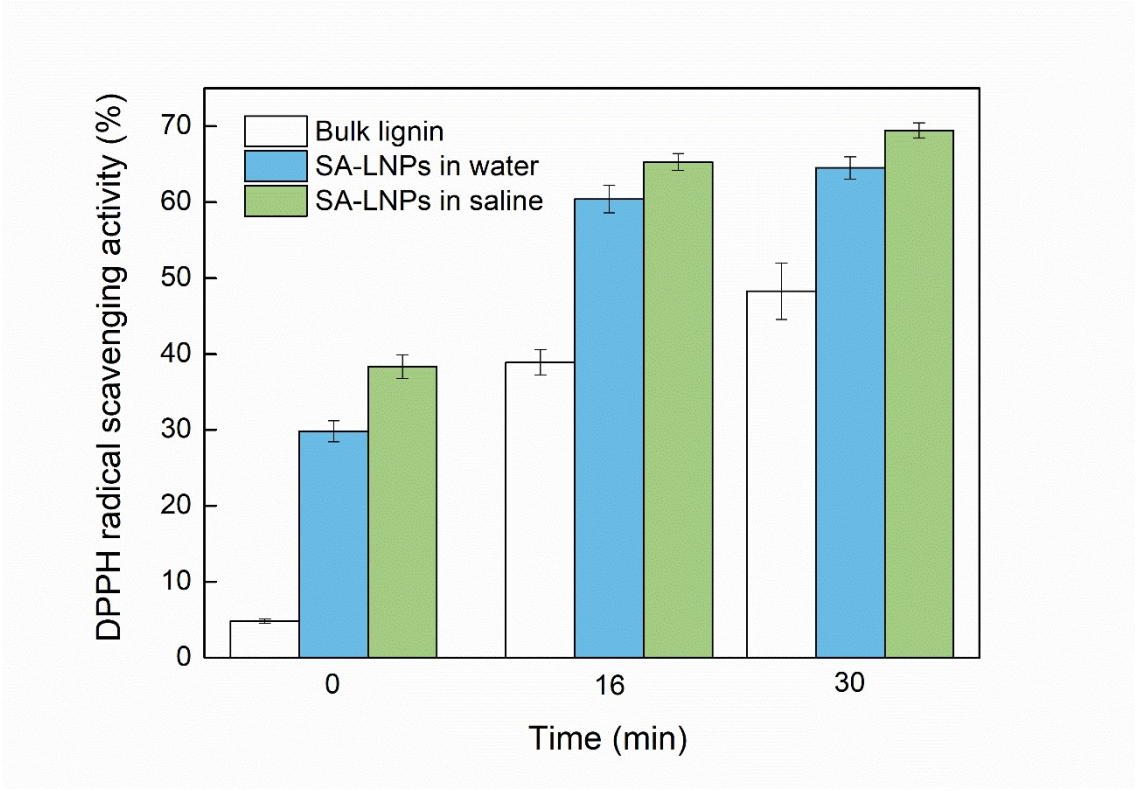

Figure S5. DPPH radical scavenging activity measured for bulk alkaline lignin dissolved in dioxane, SA-LNPs dispersed in deionized water, and SA-LNPs dispersed in saline solution. Antioxidant capacity assays were performed for 0, 16, and 30 min. After 30 min, the average scavenging activity was 48.3 ± 3.7% for bulk lignin, 64.5 ± 1.7% for SA-LNPs in water, and 69.5 ± 1.0 for SA-LNPs in saline. Lignin and SA-LNPs were tested at 50 μg/mL.