Supplementary Information

Targeted delivery of oxytetracycline to the epidermal cell junction and stomata for crop protection

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Table 1S. Hydrodynamic size of particles in the synthesize nanoformulation obtained throughDynamic Light Scattering (DLS). Lengths refer to particle diameter.



Figure 1S. DLS Particle size distribution in the synthesize nanoformulation. The material was assessed without dilution after filtration and sonication. Particles are present in a bimodal distribution.



Figure 2S. Top. Scanning electron microscopy (SEM) image of Bz drop-casted on a silica wafer and Energy-Dispersive X-Ray Spectroscopy mapping of Boron (black), Carbon (blue), Nitrogen (pink), Oxygen (cyan), Sodium (red) and Zn (green). **Bottom.** SEM image of drop-casted Bz OTC with EDS mapping utilizing the same color scheme as **Top.** Areas with high color density in the EDS mapping represent the elemental composition of the particles.



Figure 3S. SEM micrographs of Bz-OTC on a silica wafer. **A)** Residue displaying dendritic structure. **C)** Magnification of the repeating structures found in **A. B)** Residue displaying unorganized branched structure. **D)** Magnification of the particulate found on the edges of the branches of **B**.



Figure 4S. (A) Emission spectra (Ex. 390 nm) of the formulations suspended in DMSO at the application rate. (B) Emission spectra (Ex. 390 nm) of the formulations suspended in DI water at the application rate. The insets zoom in on OTC's Fluorescence peak. A large decrease in fluorescence when a formulation is suspended DI water compared to DMSO demonstrates that the fluorophore is prone to hydrolysis. The fluorescence gain was adjusted based on the most emissive formulation (OTC + BA in DMSO).



Figure 5S. ¹¹B-NMR spectra of the BZ-OTC (A), Bz (B), BA – OTC (C), and BA (D) suspended in D_2O . All intensities were normalized.



Figure 6S. ¹³C-NMR (A) and ¹H-NMR (B) spectra of BA-OTC and OTC in D_2O .



Figure 7S. (A) Bz residue on the abaxial face of a peach leaf. EDS mapping of Sodium (B), Nitrogen (C), and Zinc (D) on the surface of the leaf.



Figure 8S. Digital images of (A) Bz treated peach tree sapling, (B) Bz OTC treated peach tree sapling, and (C) OTC treated peach tree sapling 72 hours after foliar spray. The saplings do not present defoliation or show necrotic lesions or leaf burns.