



Figure S1. Representative images of *Hemileia vastatrix* disease progression in *Coffea arabica* cv. IPR 100 leaf discs at 10, 15, 20, 25, 30, 35, and 40 days after infection (DAI). The discs were treated with distilled water as a control (CONT) (a), chitosan/sodium tripolyphosphate nanoparticles without Cu^{2+} ions ($\text{NP } 0.25 \text{ g L}^{-1}$) (b), ($\text{NP } 0.5 \text{ g L}^{-1}$) (c), ($\text{NP } 1 \text{ g L}^{-1}$) (d), and chitosan/sodium tripolyphosphate nanoparticles containing Cu^{2+} ions ($\text{NPCu } 1.25 \text{ mmol L}^{-1}$) (e).



Figure S2. Representative images of *Hemileia vastatrix* disease progression in *Coffea arabica* cv. IPR 100 leaf discs at 10, 15, 20, 25, 30, 35, and 40 days after infection (DAI). The discs were treated with chitosan/sodium tripolyphosphate nanoparticles containing Cu^{2+} ions (NPCu 2.5 mmol L⁻¹) (a), (NPCu 5 mmol L⁻¹) (b), Cu^{2+} ions (Cu 1.25 mmol L⁻¹) (c), (Cu 2.5 mmol L⁻¹) (d), and (Cu 5 mmol L⁻¹) (e).



Figure S3. Field collection of coffee leaves containing urediniospores of *Hemileia vastatrix*.



Figure S4. Suspension of viable *Hemileia vastatrix* urediniospores diluted in distilled water (1 mg mL^{-1}) and application of the inoculum on the abaxial face of *Coffea arabica* cv. IPR 100 leaf discs.