Supporting Information

Photodynamic Antimicrobial Textiles for Potential Combat and Clinical Applications

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Table of Contents

1. **Scanning Electron Microscopy (SEM) imagery of PVA-SbQ/RB-coated hemp**

   Figure S1. SEM images comparing pristine hemp fabric to PVA-SbQ/RB-coated hemp fabric.

2. **Energy Dispersive X-ray Spectroscopy imagery of PVA-SbQ/RB-coated hemp**

   Figure S2. SEM-EDS elemental maps and overlay for PVA-SbQ/RB-coated hemp fabric.

3. **Energy Dispersive X-ray Spectroscopy spectra of pristine, PVA-SbQ-coated, and PVA-SbQ/RB-coated lyocell/polyester and hemp**

   Figure S3. SEM micrographs with corresponding EDS spectra of lyocell/polyester fabrics.

   Figure S4. SEM micrographs with corresponding EDS spectra of hemp fabrics.

4. **Time-of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS) for PVA-SbQ/RB hemp.**

   Figure S5. ToF-SIMS heat maps comparing pristine, PVA-SbQ-coated, and PVA-SbQ/RB-coated hemp.

5. **Thermogravimetric Analysis (TGA) of hemp material.**

   Figure S6. TGA analysis of hemp fabric, associated coating components, and PVA-SbQ/RB-coated hemp.

6. **Determination of singlet oxygen production of hemp materials.**

   Figure S7. DPBF photooxidation assays for singlet-oxygen detection comparing coated and control hemp fabric under illuminated and dark conditions.

7. **Antimicrobial Photodynamic Inactivation (aPDI) studies of hemp material.**

   Figure S8. Antimicrobial photodynamic inactivation of MRSA, VRE, *K. pneumoniae*, and MDRAB by PVA-SbQ/RB-coated hemp.

1. Scanning Electron Microscopy (SEM) imagery of PVA-SbQ/RB-coated hemp

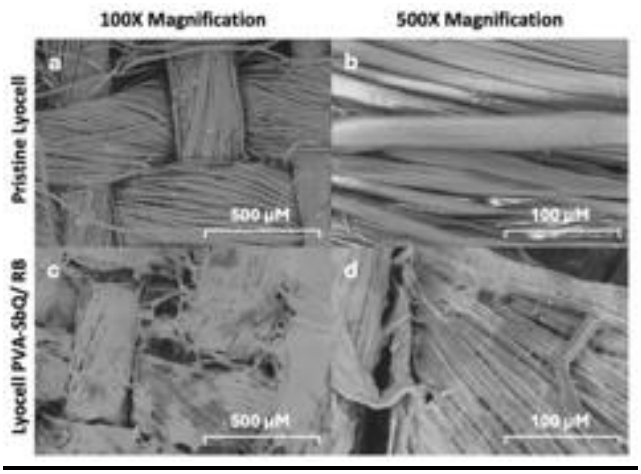

Fig S1 Representative scanning electron microscopy (SEM) images of hemp materials, comparing untreated (pristine; a, b) and PVA-SbQ/RB-coated samples (c, d). Images captured at 100× (left) and 500× (right) magnification illustrate surface morphology and effects of coating.

2. Energy Dispersive X-ray Spectroscopy imagery of PVA-SbQ/RB-coated hemp

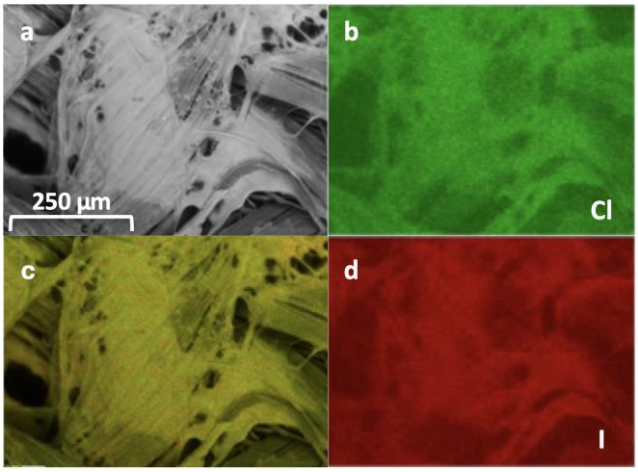

Fig S2 Scanning electron microscopy image (a) with energy dispersive spectroscopy elemental mapping of (b) Cl and (d) I for PVA-SbQ/RB hemp at 200× magnification. Quadrant (c) portrays the EDS maps overlaying the I and Cl signals.

3. **Energy Dispersive X-ray Spectroscopy spectra of pristine, PVA-SbQ-coated, and PVA-SbQ/RB-coated lyocell/polyester and hemp**

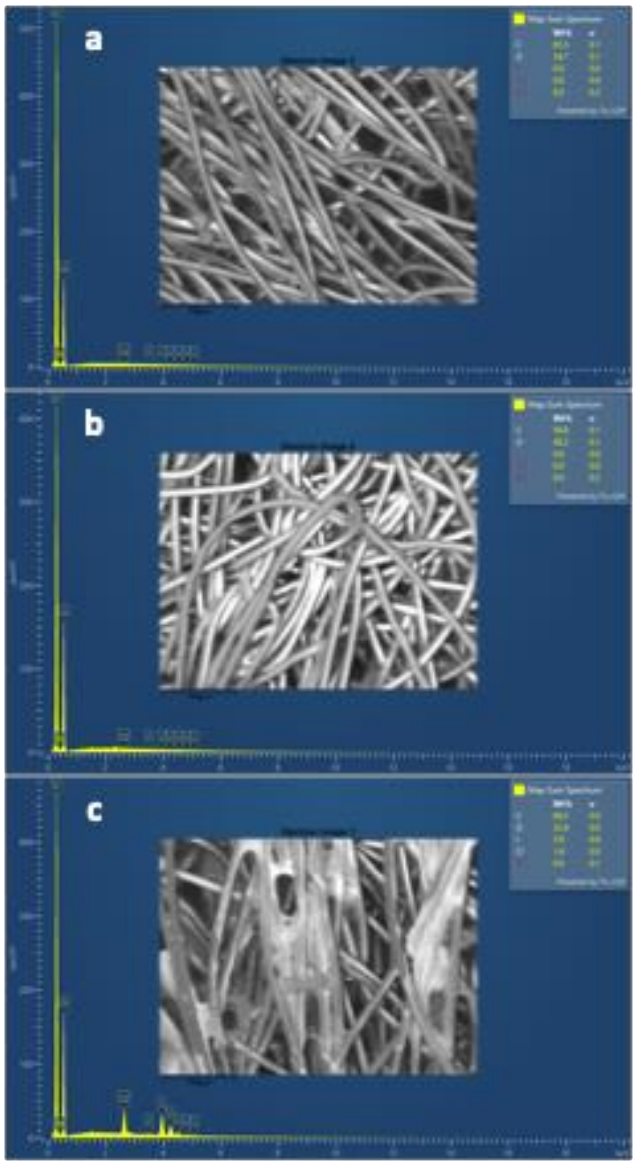

Fig S3 SEM micrographs with corresponding EDS spectra of (a) pristine lyocell/polyester, (b) PVA-SbQ-coated lyocell/polyester, and (c) PVA-SbQ/RB-coated lyocell/polyester.

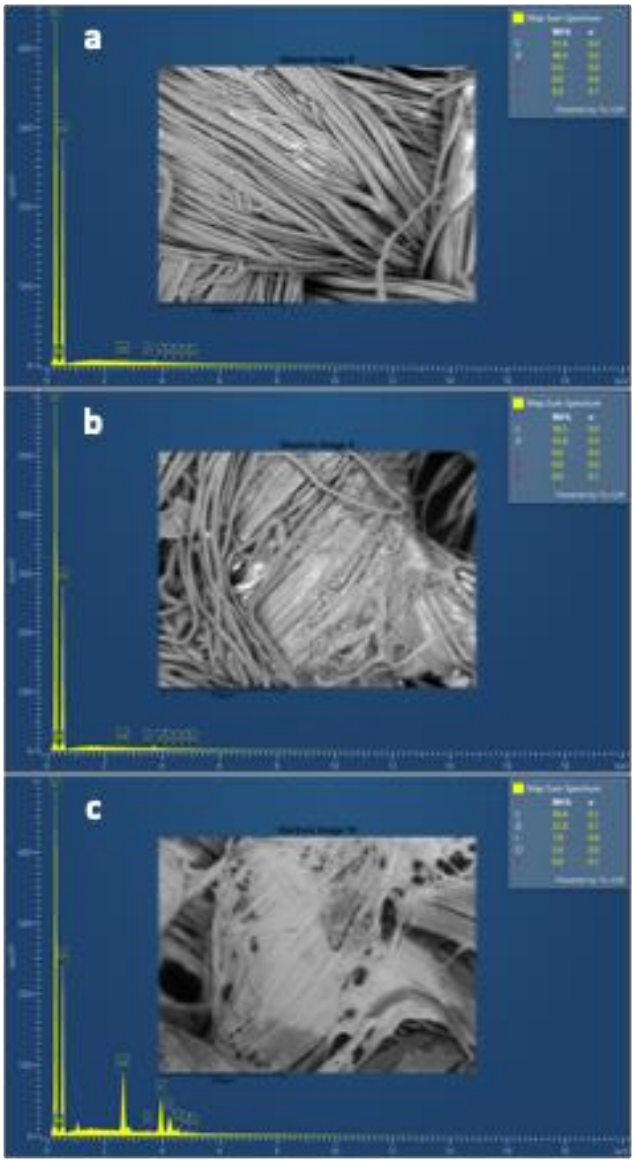

Fig S4 SEM micrographs with corresponding EDS spectra of (a) pristine hemp, (b) PVA-SbQ-coated hemp, and (c) PVA-SbQ/RB-coated hemp.

4. Time-of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS) for PVA-SbQ/RB hemp.

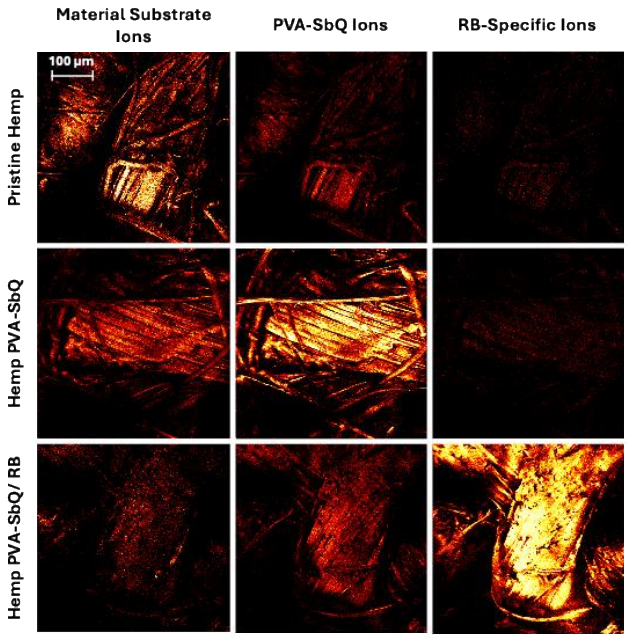

Fig S5 Heat maps generated via ToF-SIMS depicting the characteristic ions of pristine hemp (top row), PVA-SbQ-coated hemp (middle row), and PVA-SbQ/RB-coated hemp (bottom row).

5. Thermogravimetric Analysis (TGA) of hemp material.

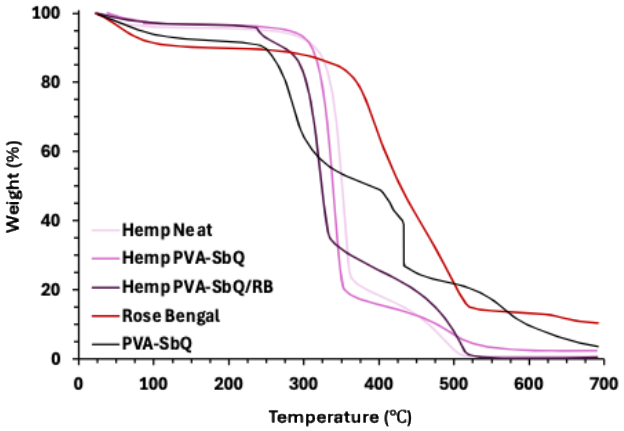

Fig S6 Thermogravimetric analysis (TGA) of pure Rose Bengal, neat PVA-SbQ, PVA-SbQ-coated, and PVA-SbQ/RB-coated hemp.

6. Determination of singlet oxygen production of hemp materials.

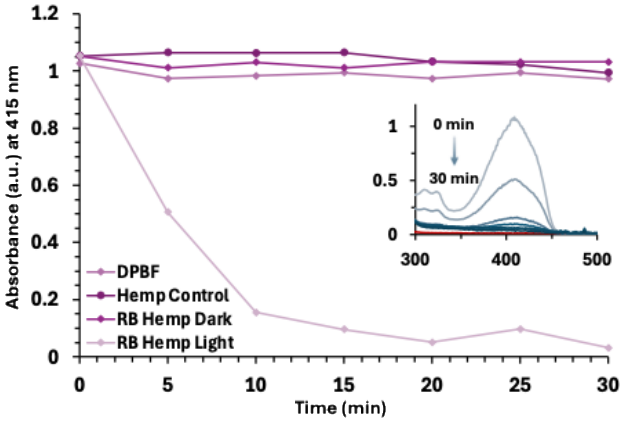

Fig S7 Photooxidation studies of DPBF by PVA-SbQ/RB-coated hemp. Each panel depicts the 415 nm absorbance of DPBF (0.05 mM) undergoing photooxidation upon illumination with visible light (532 nm, 68 ± 2 mW/cm^2) in the absence of material (DPBF only), in the presence of pristine material (control), and in the presence of the PVA-SbQ/RB-coated material, as well as the latter in the absence of illumination (dark control). The insets depict time-dependent spectroscopic monitoring of DPBF photodegradation in the presence of PVA-SbQ/RB-coated materials illuminated with the aforementioned laser light source.

7. Antimicrobial Photodynamic Inactivation (aPDI) studies of hemp material.

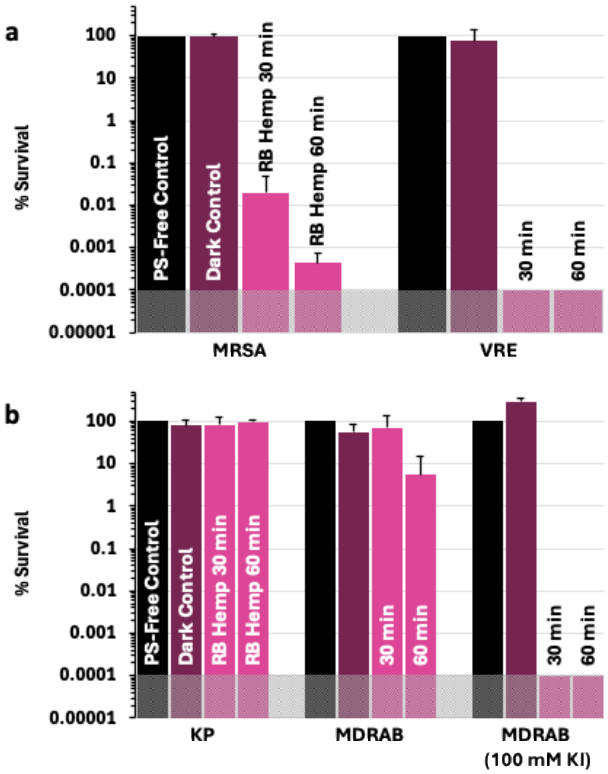

Fig S8 Antibacterial photodynamic inactivation (aPDI) studies against (a) Gram-positive MRSA and VRE, and (b) Gram-negative KP and MDRAB. The PVA-SbQ/RB-coated hemp dark control (dark magenta) and illumination studies (magenta) are shown as bacterial survival percentages when compared to the material-free (bacteria only) dark control (black). Where indicated, 100 mM potassium iodide (KI) was employed as a potentiator. All light studies were conducted under uniform illumination conditions (400–700 nm, 42 ± 5 mW/cm^2) for 30 or 60 minutes. The limit of detection was 0.0001% survival, indicated by the shaded gray region.