Supplementary Materials

For a better understanding of the evolution of the microorganism population on the coated silk samples, a digital mapping of the contaminated areas was conducted and the respected areas were measured, as shown in Figure S1.

The 44.0% of the surface of the silk sample coated by Siloxane was contaminated (Figure S1a). The silk samples coated by Siloxane+AM (Figure S1b) and Siloxane+SiO_2 (Figure S1c) show roughly the same degree of contamination, as the relative contaminated areas were 28.4% and 30.2%, respectively. This result is in agreement with the observation which was based on the photographs of Figure 4b,c (main article). Finally the sample which was coated by Siloxane+AM+SiO_2 is practically free of contamination. The result of Figure 1Sd showed that only the 6.9% of the total area was contaminated whereas the remaining 93.1% was free of microorganisms.

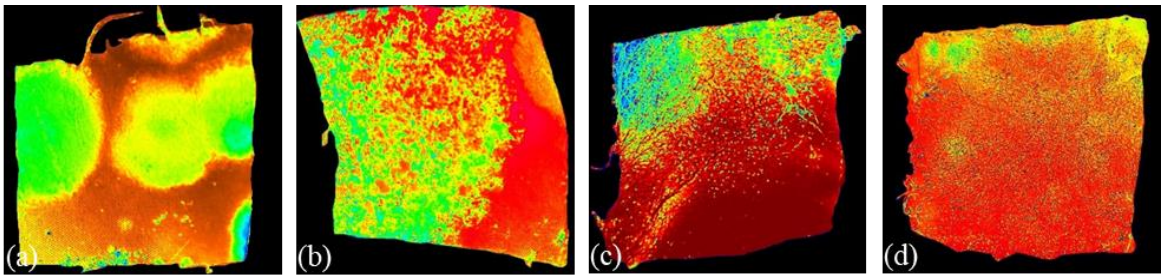

Figure S1. Mapping of samples after their exposure to microorganisms. Contaminated areas correspond to blue-green-yellow regions and areas free of contamination are designated by red regions. Silk samples were coated by (**a**) Siloxane, (**b**) Siloxane+AM, (**c**) Siloxane+SiO_2 and (**d**) Siloxane+AM+SiO_2. The % relative contaminated areas are measured as follows: (**a**) 44.0%, (**b**) 28.4%, (**c**) 30.2% and (**d**) 6.9%.

Figure S2 shows the absorption measurements which were carried out in potato dextrose agars, used for microorganism cultivation on silk samples coated by Siloxane+AM, Siloxane+SiO_2 and Siloxane+AM+SiO_2. For comparison, the absorption curve of agar in which no silk sample was immersed is included. The results reveal a rich microbial load in the agar used for the treatment of silk which was coated by Siloxane+AM. Moreover, the experimental curves indicate that the microbial load attached on the silk sample coated by Siloxane+AM+SiO_2 is significantly lower, compared to the silk samples treated with compositions that include either Siloxane+AM or Siloxane+SiO_2. Interestingly, the silk sample, which is coated by Siloxane+SiO_2, appears to carry a lower microbial load, compared to the sample treated with Siloxane+AM. The SiO_2 nanoparticles induce superhydrophobicity and therefore they practically inhibit the attachment of the microorganisms onto the treated silk surface. The qualitative comparison of the Siloxane+AM or Siloxane+SiO_2 coatings that was carried out previously in Figure S1 (and in Figure 4 of the main article) suggested that the antimicrobial properties of the two coatings are not different. However, the quantitative results of Figure S2 show that the Siloxane+SiO_2 coating offers a better protection against microbial attack than the Siloxane+AM coating, thus demonstrating the multiple beneficial properties induced by the use of superhydrophobic coatings.

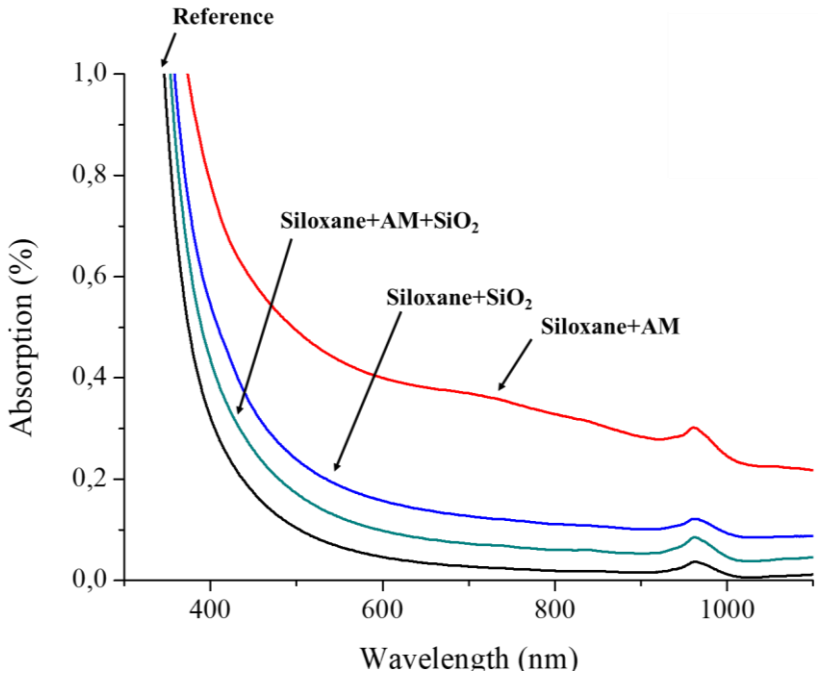

Figure S2. Absorption curves measured for potato dextrose agars (culture media). Agars were used for microorganism development on three samples coated by Siloxane+AM, Siloxane+SiO_2 and Siloxane+AM+SiO_2. For comparison, the absorption curve of agar in which no silk sample was immersed is included (reference sample).