materials

MDPI

Supplementary Material

Polyurethane-Based Coatings with Promising Antibacterial Properties

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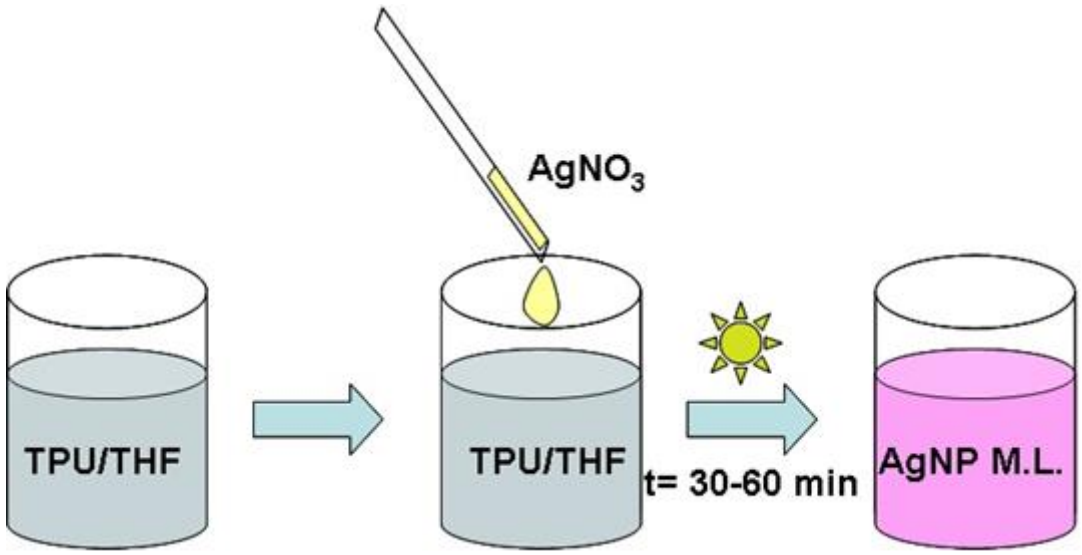

Figure S1. Schematic representation of the general procedure used for the preparation of M.L.

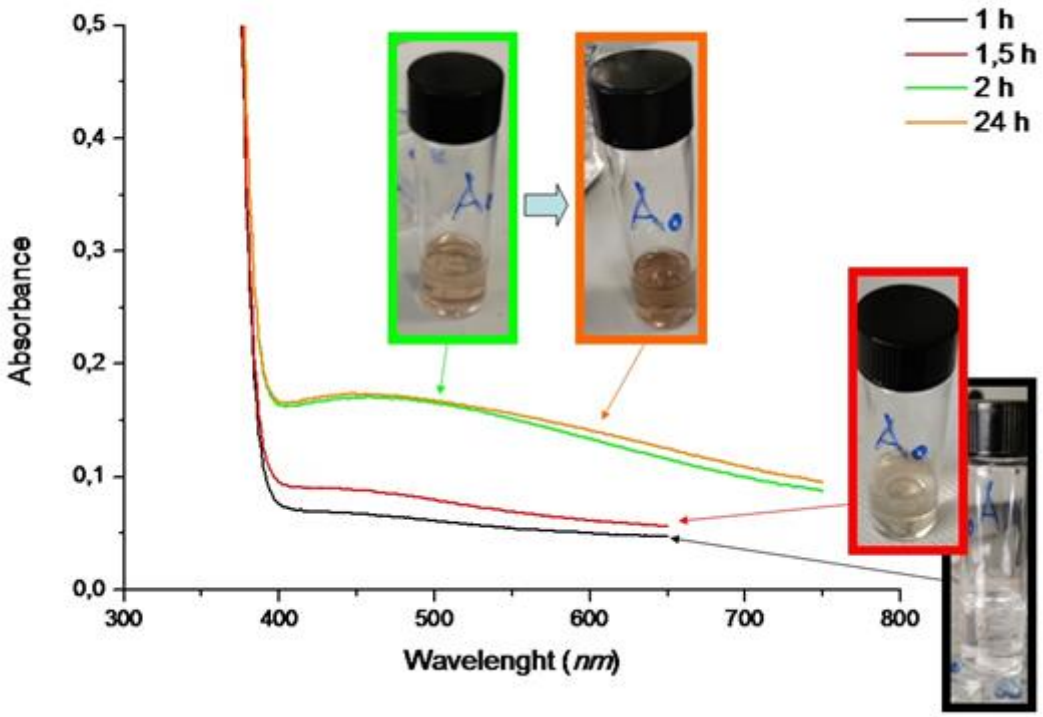

Figure S2. UV Absorption spectra as a function of exposure time to sun light for a M.L.1 sample.

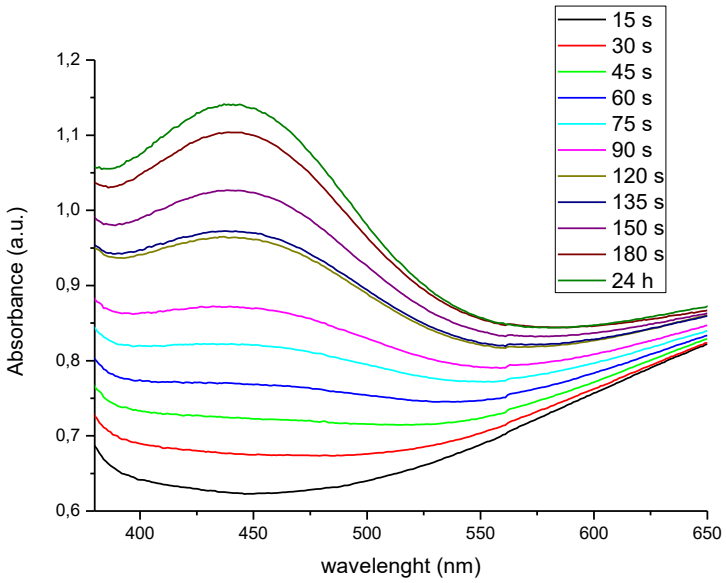

Figure S3. UV Absorption spectra as a function of exposure time to ultraviolet light for a samples at 50mM Ag precursor concentration.

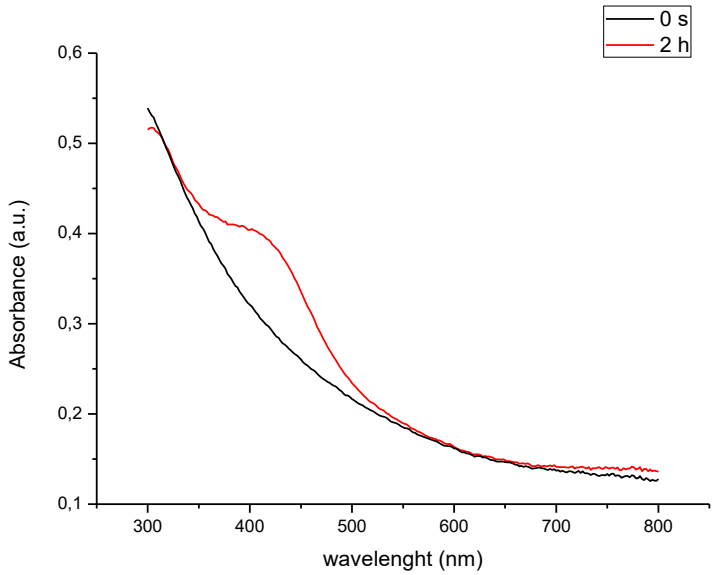

Figure S4. UV Absorption spectra as a function of exposure time to sun light for a film of M.L.5 prepared by spin coating deposition.

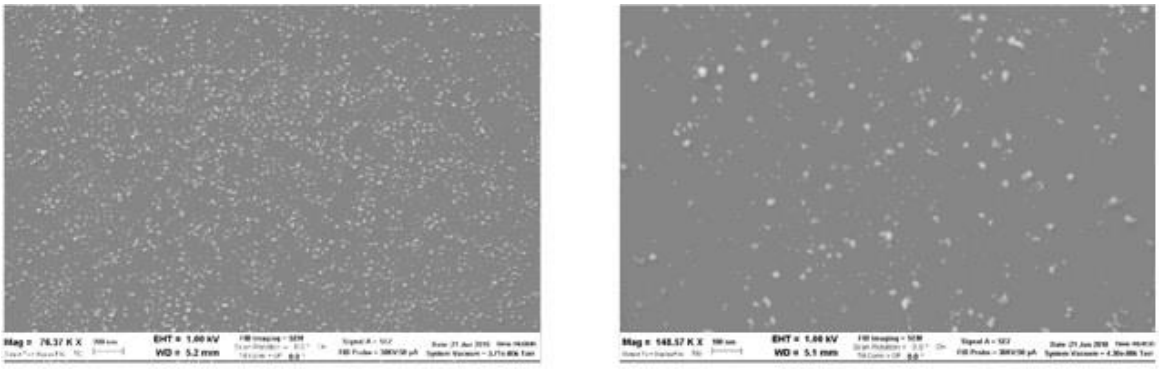

Figure S5. Surface morphology images of a homogeneous film obtained from M.L.1 and deposited by spin-coating at 76 kX (**a**) and at 148 kX (**b**) after plasma treatment.

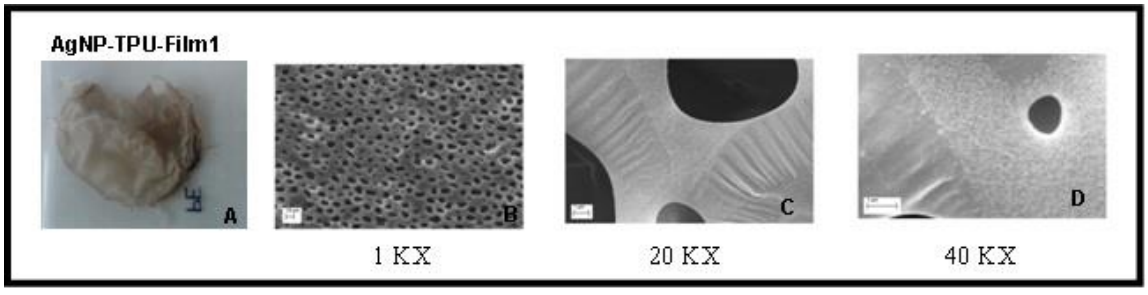

Figure S6. Photographic image of AgNP-TPU-Film1 (**A**) and surface morphology images of AgNP-TPU-Film1 at 1 kX (**B**), 20 kX (**C**) and 40 kX (**D**).

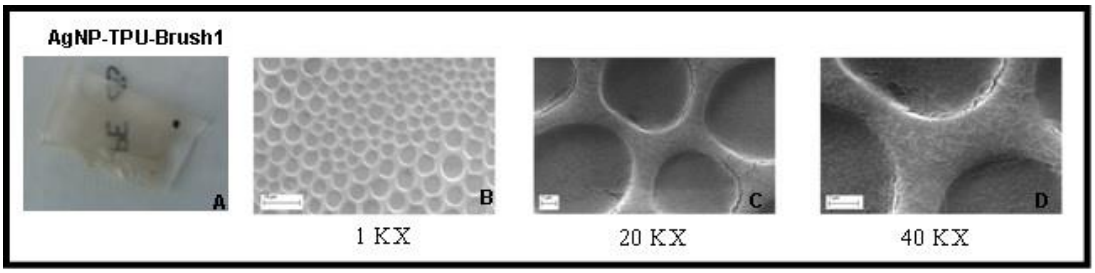

Figure S7. Photographic image of AgNP-TPU-Brush1 (**A**) and surface morphology images of AgNP-TPU-Brush1 at 1 kX (**B**), 20 kX (**C**) and 40 kX (**D**).

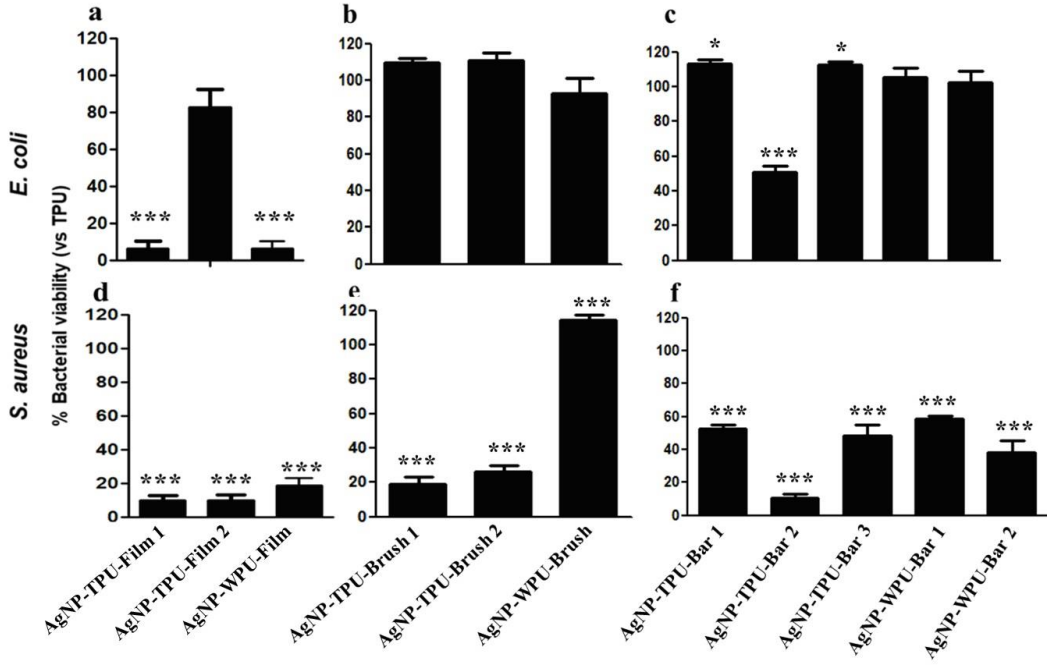

Figure S8. Planktonic bacterial viability through direct contact with materials. Comparison of *E. coli* ATCC 25922 (a-c) and *S. aureus* ATCC 25923 (d-f) viability with TPU set 100% after 6 h of incubation. Bars indicate mean values ± SD of the mean of results from two experiments. t-student test, statistical significance values were $P < 0.05$ (*) and $p < 0.001$ (***).

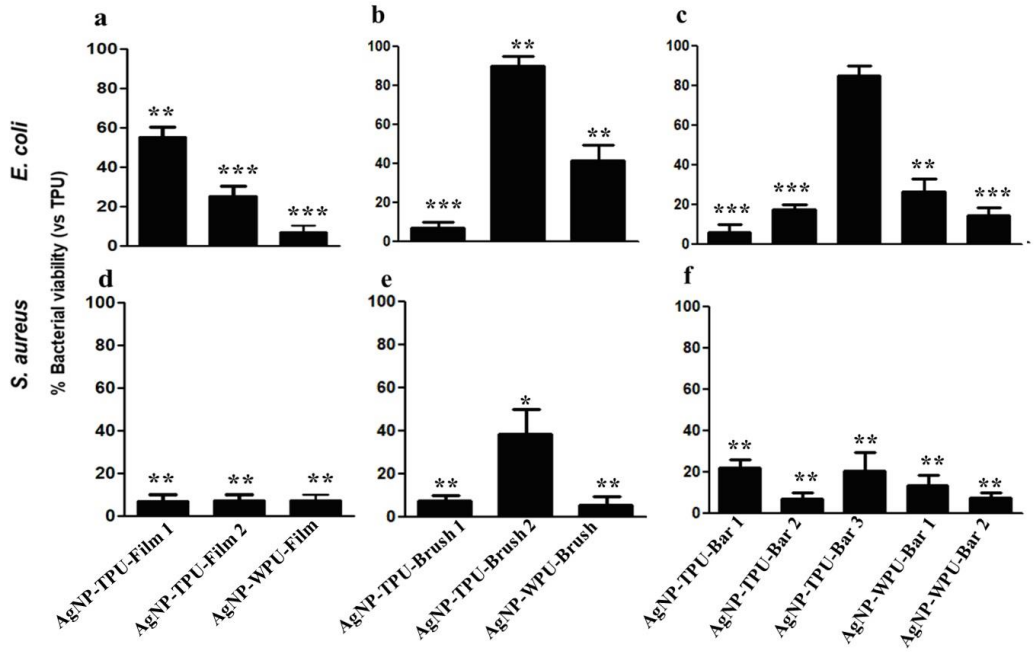

Figure S9. Bacterial adhesion on films through direct contact with materials. Comparison of *E. coli* ATCC 25922 (a-c) and *S. aureus* ATCC 25923 (d-f) viability with TPU set 100% after 6 h of incubation. Bars indicate mean values ± SD of the mean of results from two experiments. t-student test, statistical significance values were $P < 0.05$ (*), $p < 0.01$ (**) and $p < 0.001$ (***).

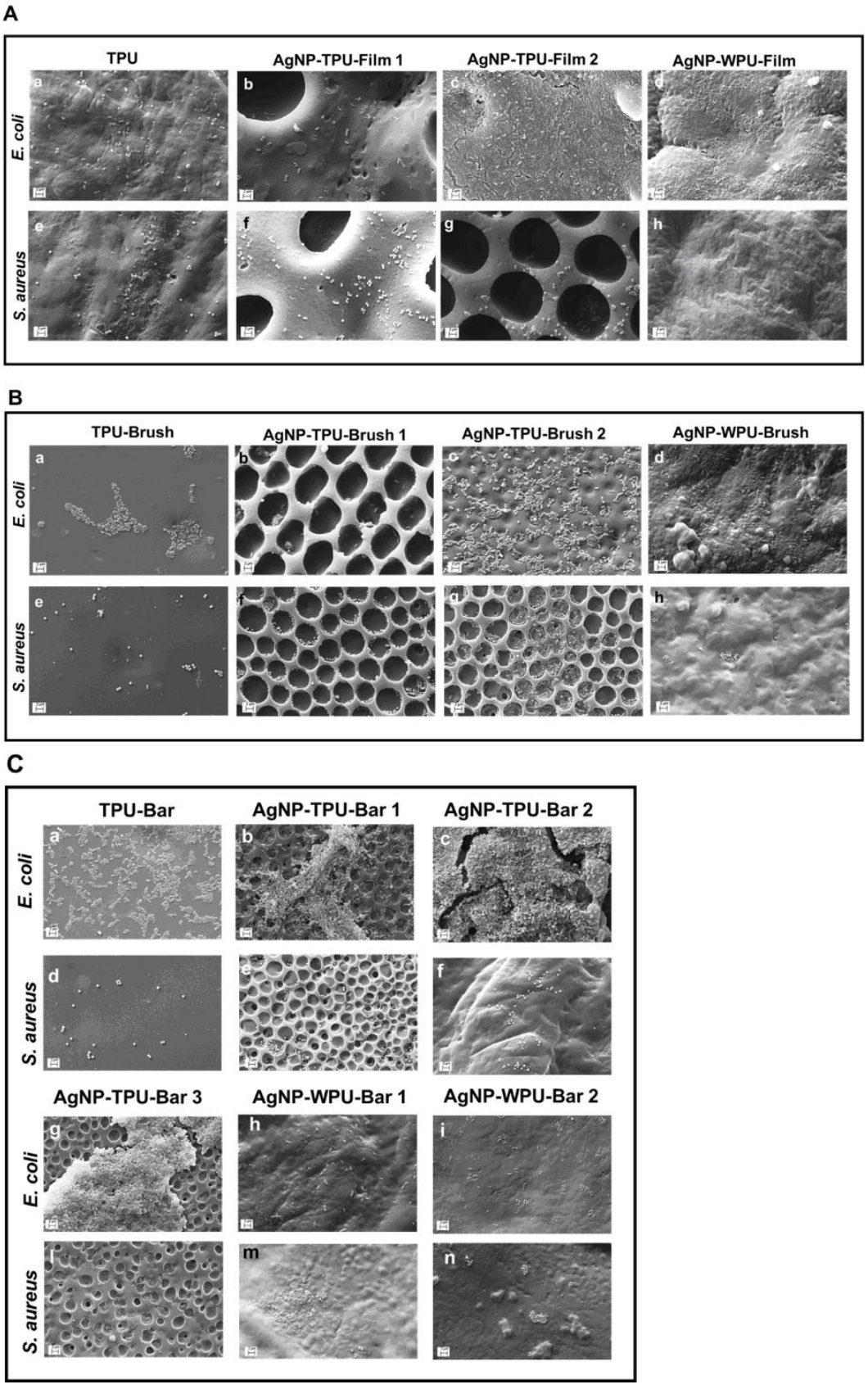

Figure S10. SEM images of bacteria adherent on TPU and WPU polymeric films at 3 kX (scale bar 10 μm). Panel A: *E. coli* (**a**–**d**), S. aureus (**e**–**h**) on TPU and casted films; panel B: *E. coli* (**a**–**d**), *S. aureus* (**e**–**h**) on brush films; panel C: *E. coli* (**a**–**c**; **g**–**i**), *S. aureus* (**d**–**f**; **l**–**n**) on bar coater films.

Table S1. pH values of the different reported samples after 24 h at 37°C measured in physiologic solution and Luria Bertani broth.

	pH	
	Physiologic solution	**Luria Bertani broth**
TPU	6	7
AgNP-TPU-Film 1	6	7
AgNP-TPU-Film 2	6	7
AgNP-WPU-Film	6	7
PU-Brush	6	7
AgNP-TPU-Brush 1	6	7
AgNP-TPU-Brush 2	6	8
AgNP-WPU-Brush	6	7
PU-Bar	6	7
AgNP-TPU-Bar 1	6	7
AgNP-TPU-Bar 2	6	7
AgNP-TPU-Bar 3	6	7
AgNP-WPU-Bar 1	6	7
AgNP-WPU-Bar 2	6	7

Figure S11. Photographic image of AgNP dispersed in a CHIT-solution after sun light exposition.

Figure S12. (**a**) prototype biomedical probe in polyurethane coated with an AgNP / TPU. To make the AgNP / TPU coating (tendentially pink / transparent) visible, a low amount of phosphorescent strontium aluminate was added. (**b**) prototype biomedical probe in polyurethane coated with an AgNP / WPU.

Figure S13. TPU-based coatings deposited on polyethylene substrates.