

SUPPORTING INFORMATION FOR:

Effect of the combined addition of ultrasonicated
kraft lignin and montmorillonite on hydroxypropyl
methylcellulose bionanocomposites

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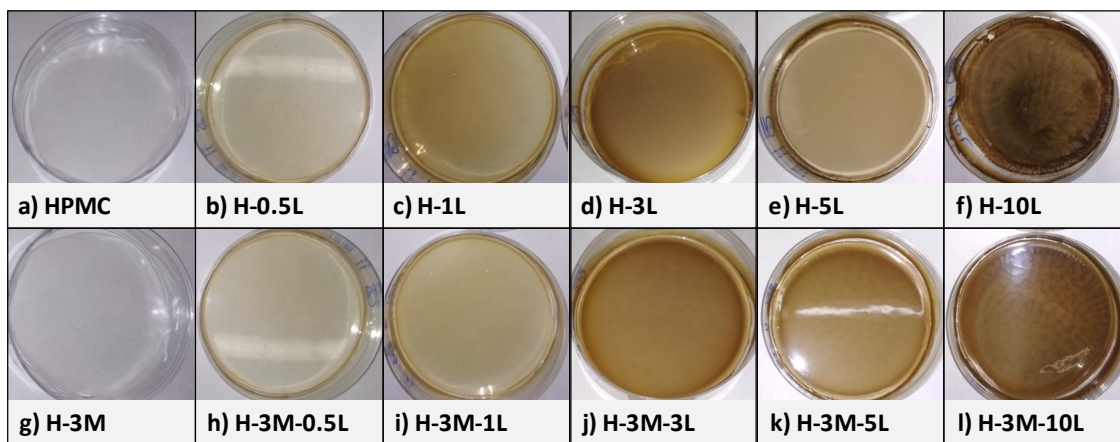


Figure SI.1. HPMC films without (a-f) and with (g-l) 3% montmorillonite and with different lignin content: 0% (a and g), 0.5% (b and h), 1% (c and i), 3% (d and j), 5% (e and k) and 10% (f and l).

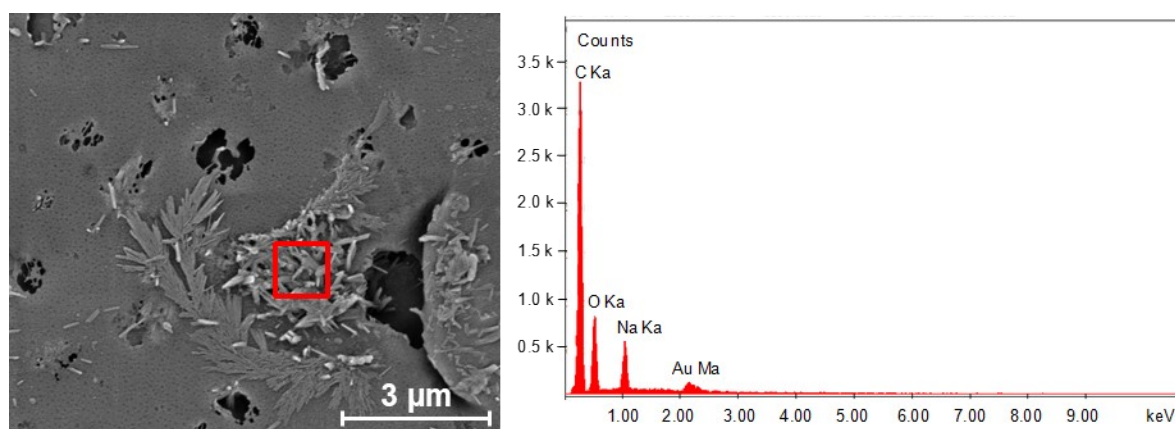


Figure SI.2. EDX analysis of staked rods observed in H-5L film (marked with a red square)

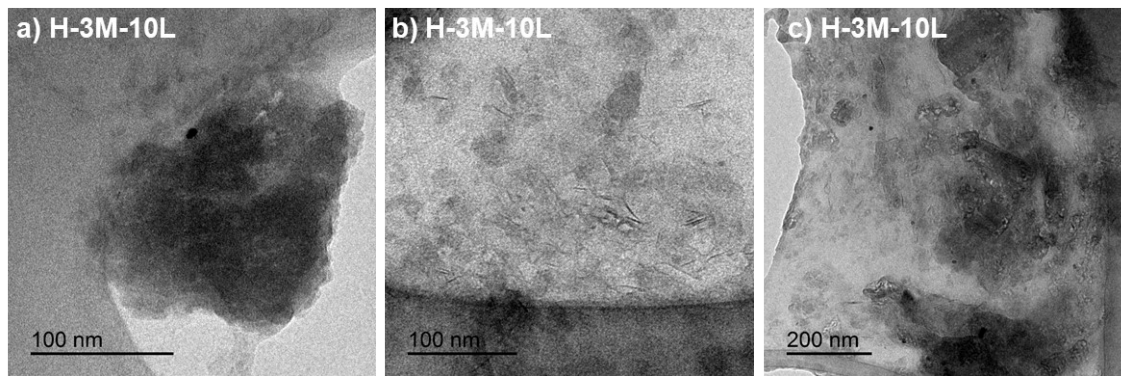


Figure SI.3. TEM images of HPMC films with 3% montmorillonite and 10% lignin.

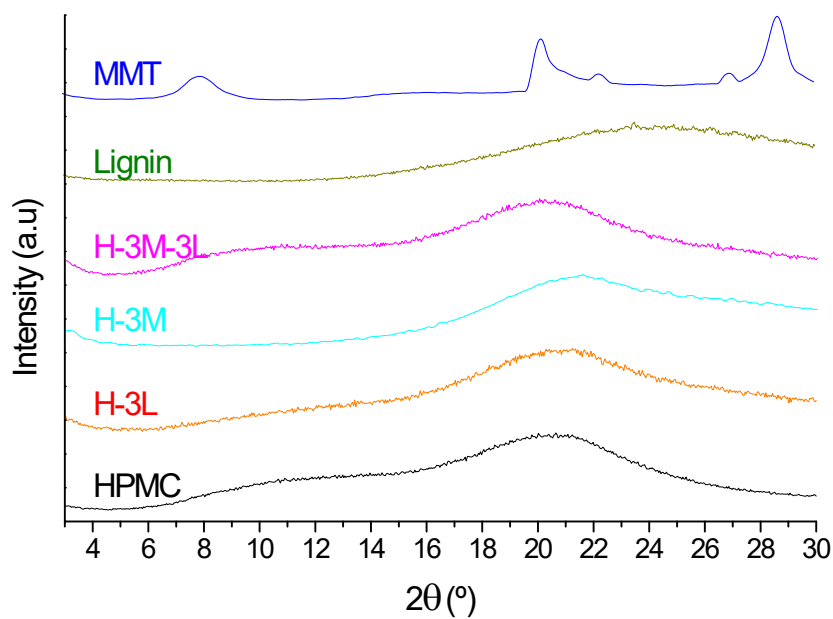


Figure SI.4. XRD patterns of montmorillonite (MMT), lignin and HPMC, H-3L, H-3M and H-3M-3L films.

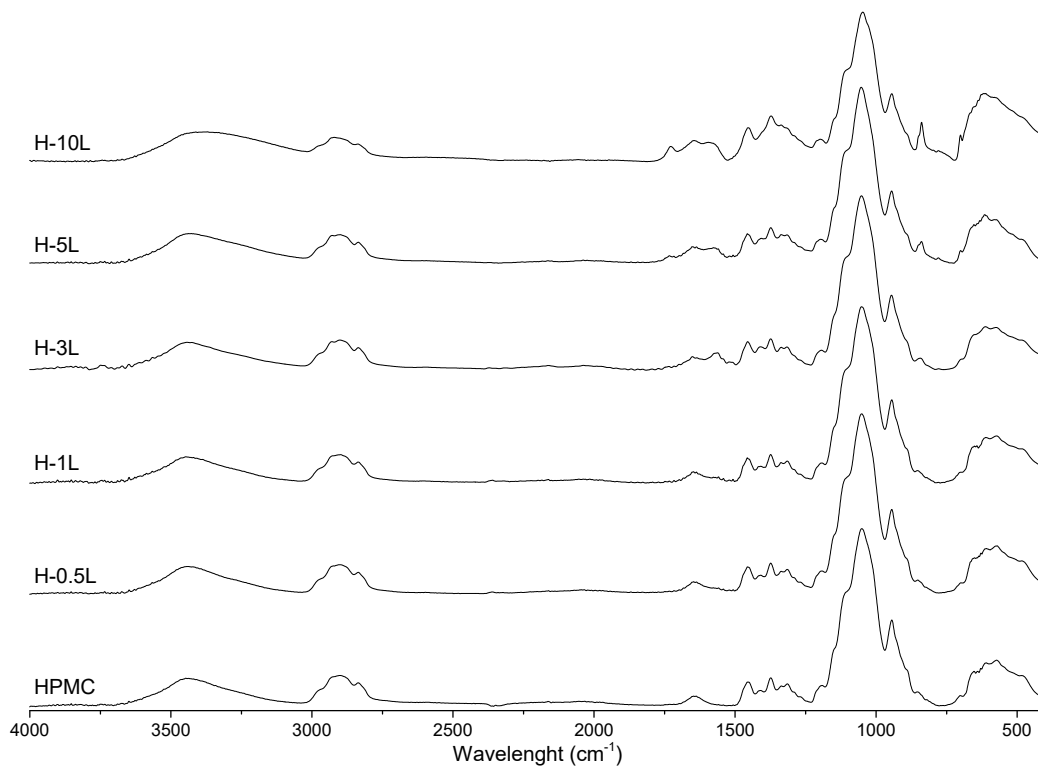


Figure SI.5. Fourier Transform Infrared (FTIR) spectra of HPMC without montmorillonite and with different lignin content (0-10%).

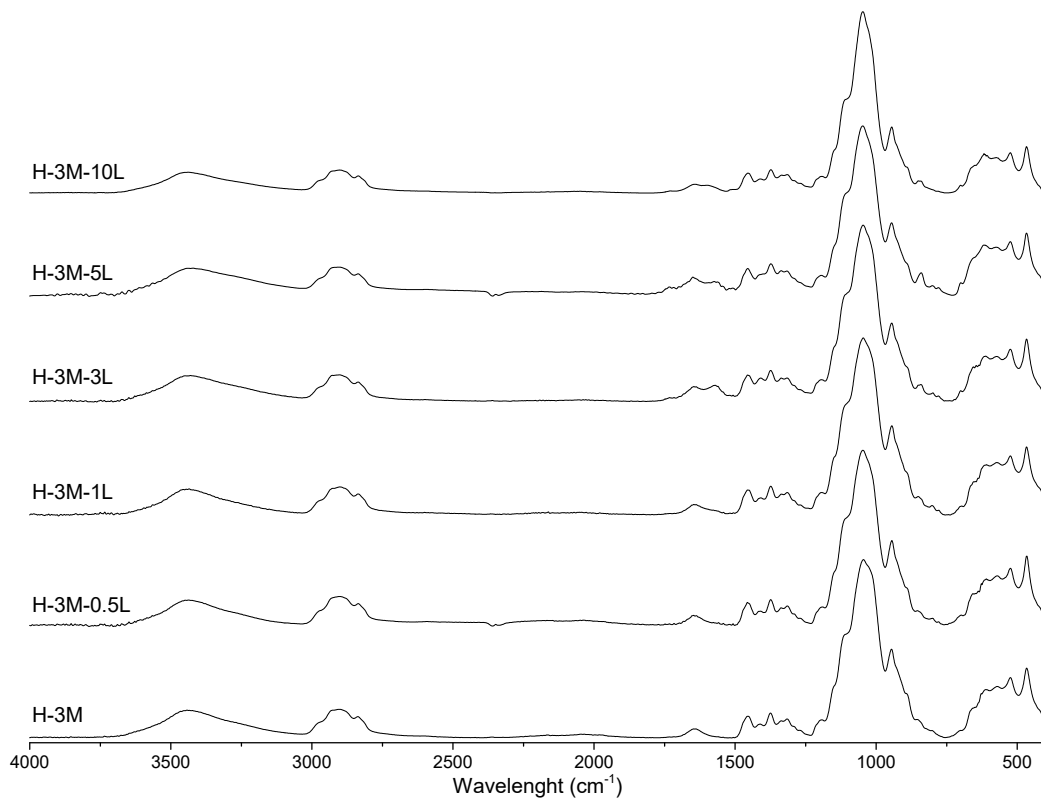


Figure SI.6. Fourier Transform Infrared (FTIR) spectra of HPMC film with 3% montmorillonite and with different lignin content (0-10%).

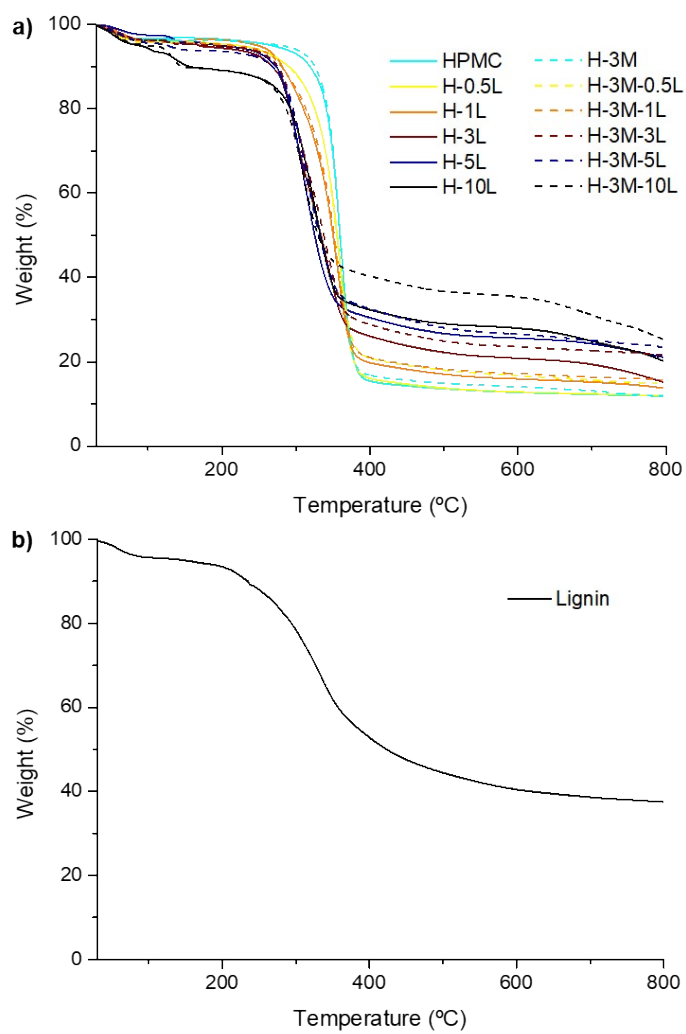


Figure SI.7. Thermogravimetric curves of a) the HPMC films without (continuous lines) and with montmorillonite (dash lines) and with different lignin content, and b) kraft lignin.

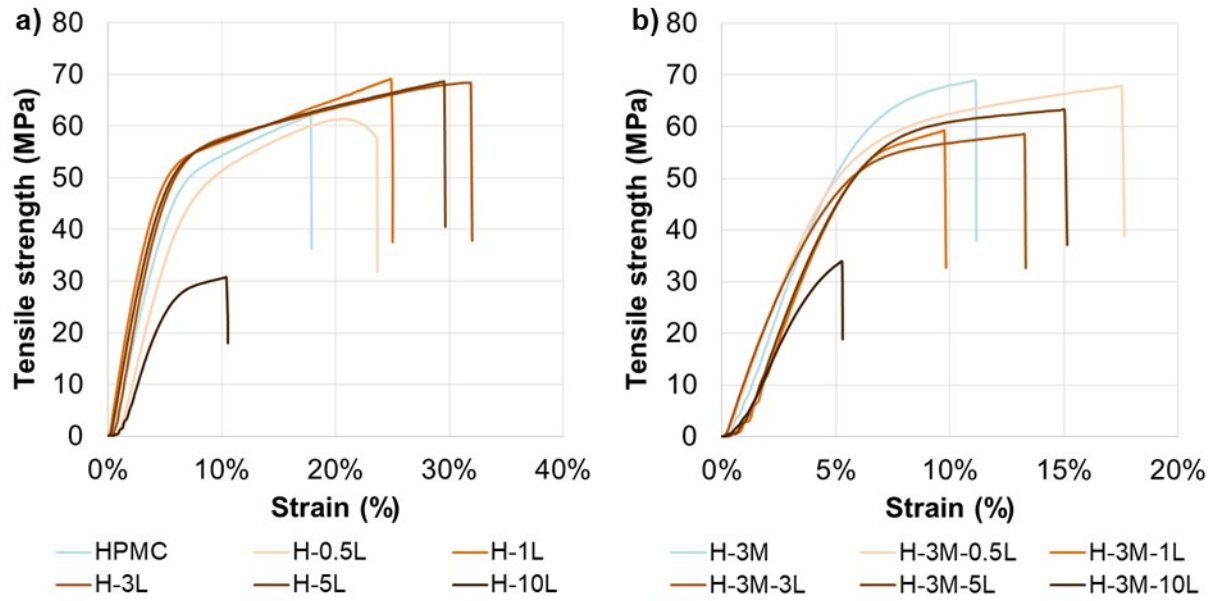


Figure SI.8. Stress-strain curves for bionanocomposite films a) without montmorillonite and b) with montmorillonite

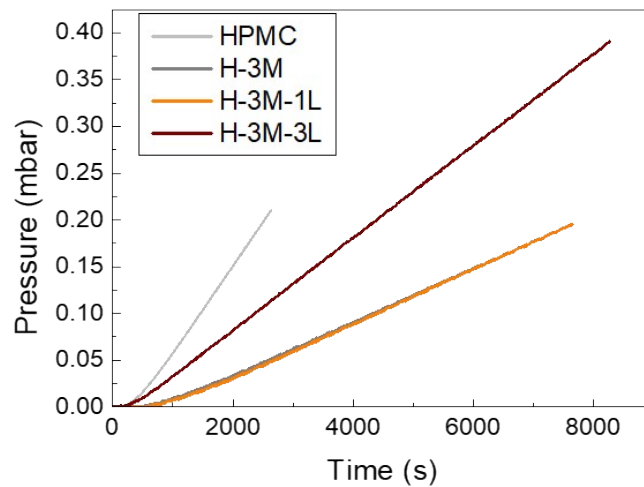


Figure SI.9. Evolution of the oxygen pressure in the low pressure chamber at 30°C across HPMC, H-3M, H-3M-1L and H-3M-3L samples.

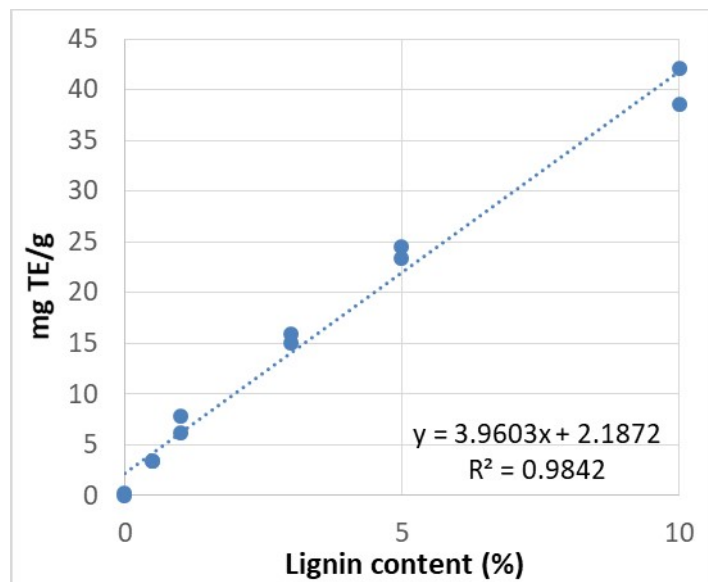


Figure SI.10. Linear relationship between antioxidant capacity and lignin content of the bionanocomposite films.

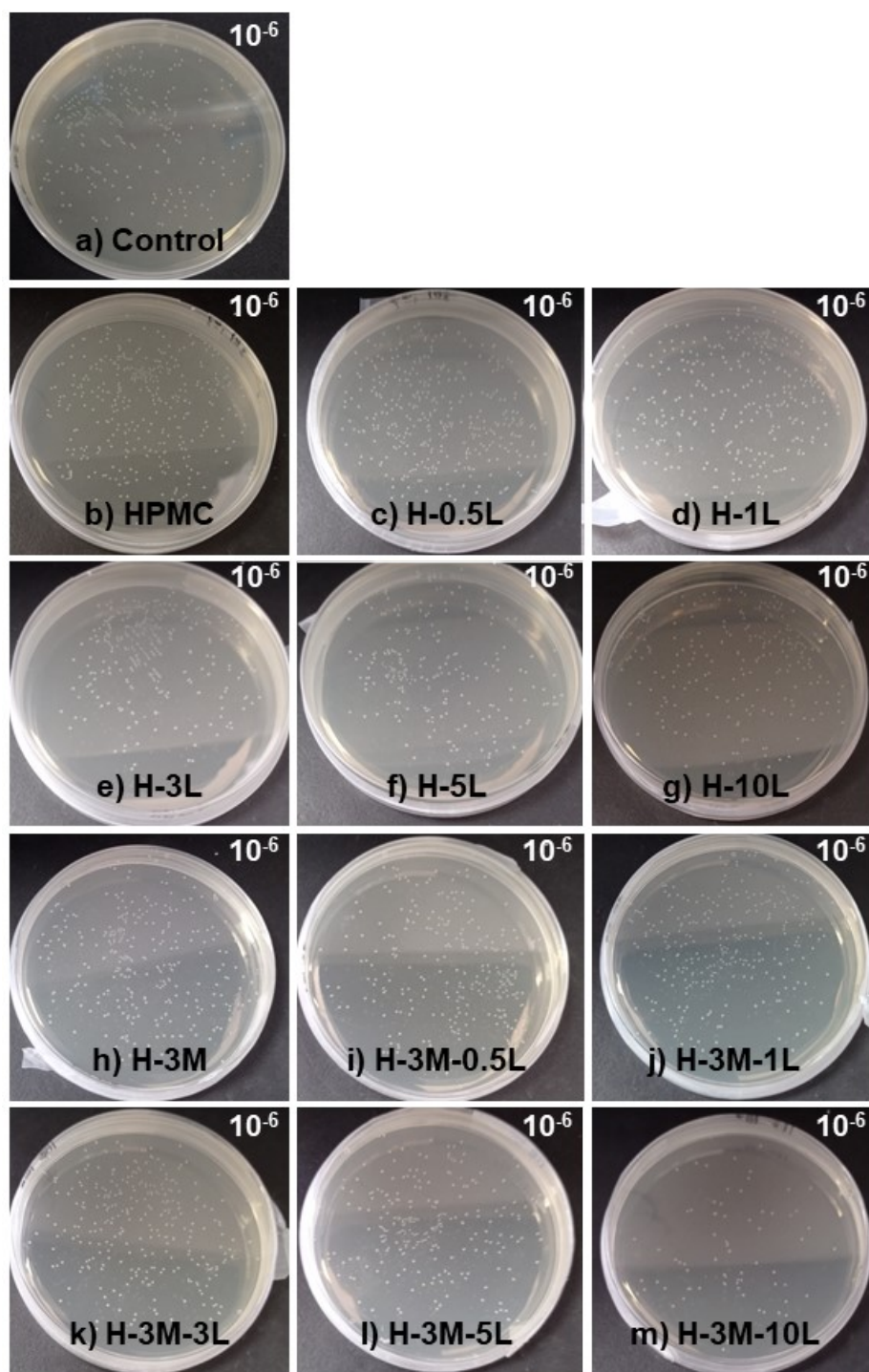


Figure SI.11. Photographs of the agar plates used for counting the number of *E. coli* colonies grown in the presence of each bionanocomposite film. Control sample without any film was also included, and indicated as control. All images correspond to 10^{-5} dilutions of the corresponding cultures.

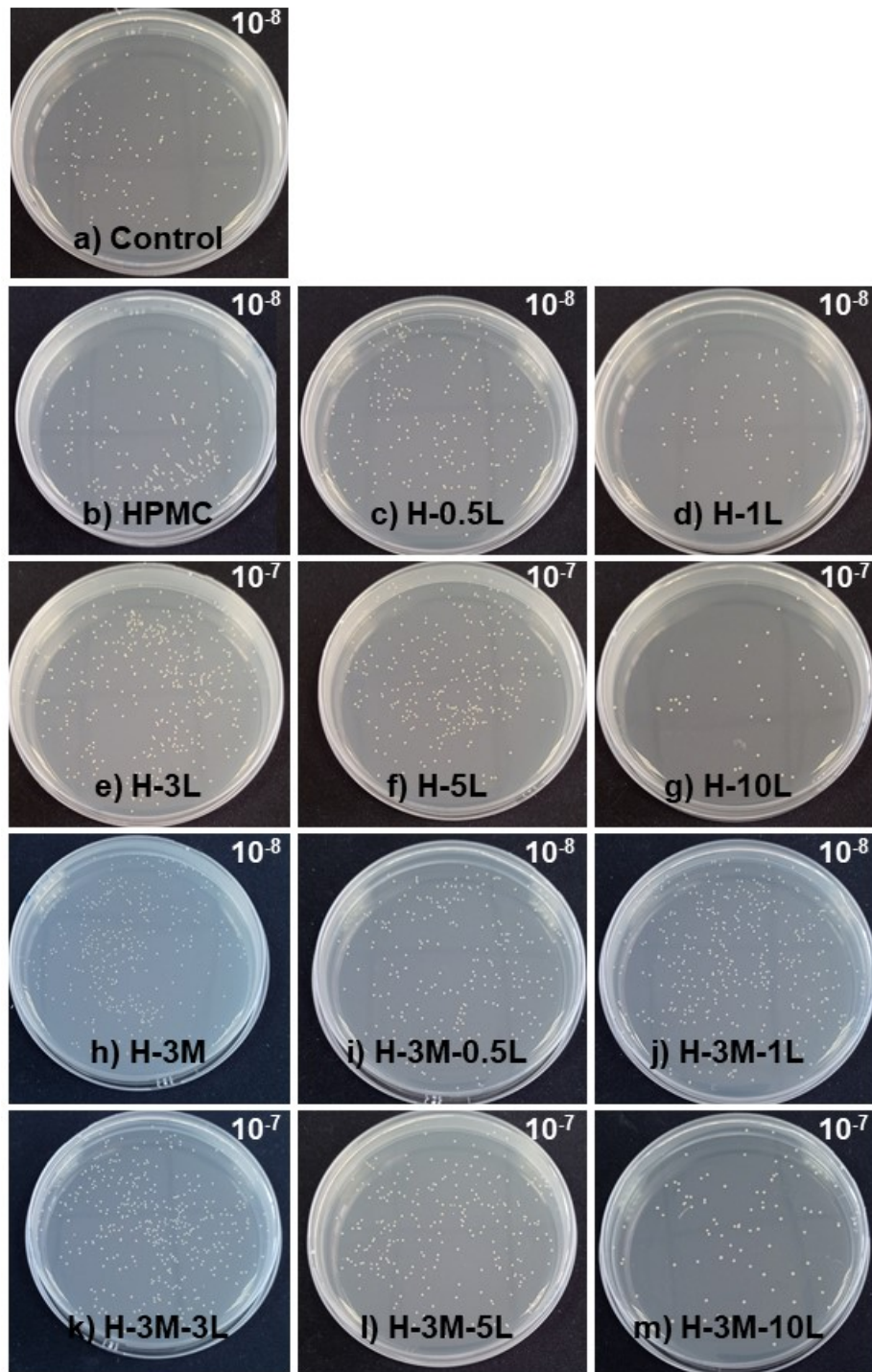


Figure SI.12. Photographs of the agar plates used for counting the number of *S. aureus* colonies grown in the presence of each bionanocomposite film. Control sample without any film was also included, and indicated as control. Images a-d and h-j correspond to 10^{-8} dilutions, and e-g and k-m to 10^{-7} dilutions of the corresponding cultures.