Electronic Supplementary Material (ESI) for RSC Advances.


# SUPPLEMENTARY INFORMATION

## Dual applications of silver nanoparticles incorporated functionalized MWCNTs grafted surface modified PAN nanofibrous membrane for water purification

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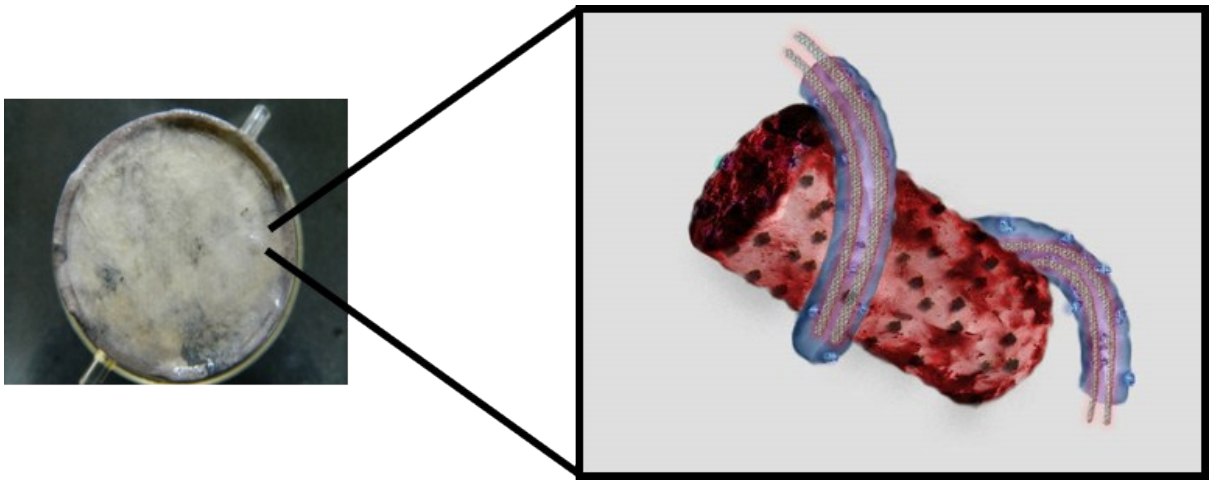

**Fig.S1** 3D pattern of nanofibrous membrane

| Sample | temperature at 1st decomposition occurs (°C) | residual matter at 800°C (%) | temperature at maximum weight loss rate (°C) |
|---|---|---|---|
| **Pristine PAN** | 320 | <1 | 730 |
| **Aminated PAN** | 220 | 32 | 730 |
| **Aminated PAN/Ag-PEGylated MWCNT-COOH nanofibrous membrane** | 215 | 49 | 700 |

**Table.S1** Thermal analysis of PAN, Aminated PAN and nanofibrous membrane

| Samples | Elastic modulus (Mpa) | UTS (Mpa) | Strain failure (%) |
|---|---|---|---|
| **PAN nanofiber** | 0.1607 | 1.6 | 57.8 |
| **Nanofibrous Membrane** | 0.2494 | 2.344 | 57.5 |

**Table.S2** Mechanical properties of as spun PAN nanofiber and the nanofibrous membrane

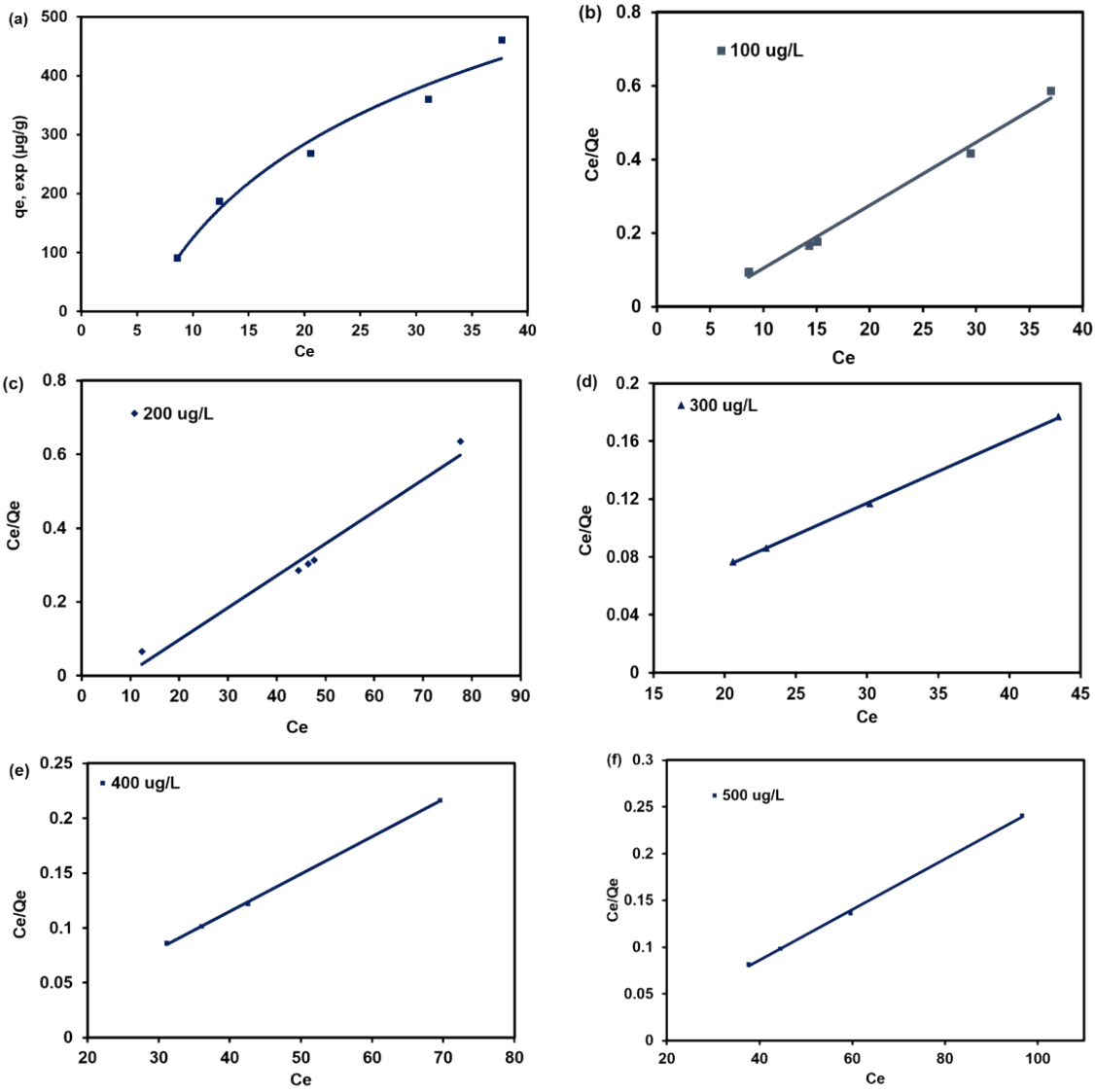


**Fig.S2** (a) Adsorption isotherm and (b-f) Langmuir isotherm plot

| Adsorbent | Concentrations (μg/L) | Langmuir model | | |
|---|---|---|---|---|
| | | $Q_m$ (μg/g) | $K_L$ | $r^2$ |
| Aminated PAN nanofiber mats | 100 | 58.47 | 3.85 | 0.9925 |
| | 200 | 114.94 | 8.74 | 0.9737 |
| | 289 | 227.27 | 3.31 | 0.9995 |
| | 391.02 | 294.11 | 6.14 | 0.9994 |
| | 498.34 | 370.37 | 8.29 | 0.9989 |

**Table.S3** Values of parameters associated with the Langmuir isotherm model, including the correlation coefficient for the adsorption of As(III) on the aminated PAN nanofibers (APAN)


**Fig.S3** (a) Experimental setup of filtration unit

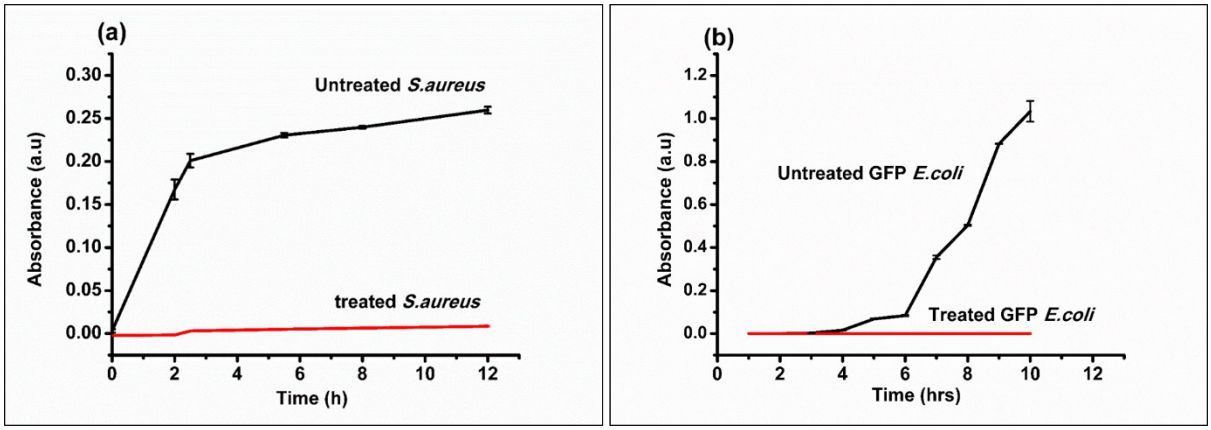


**Fig.S4** UV-visible absorption spectra of time dependent antibacterial study of nanofibrous membrane against (a) *S.aureus* (b) GFP *E.coli*

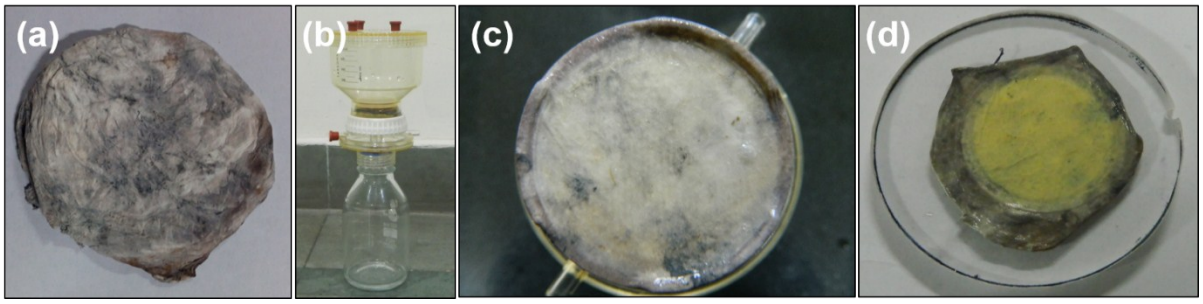


**Fig.S5** Concatenate events of bacterial filtration study (a) membrane before filtration (b) filtration setup (c) after cycle1 in wet condition due to washing (d) after 3cycles

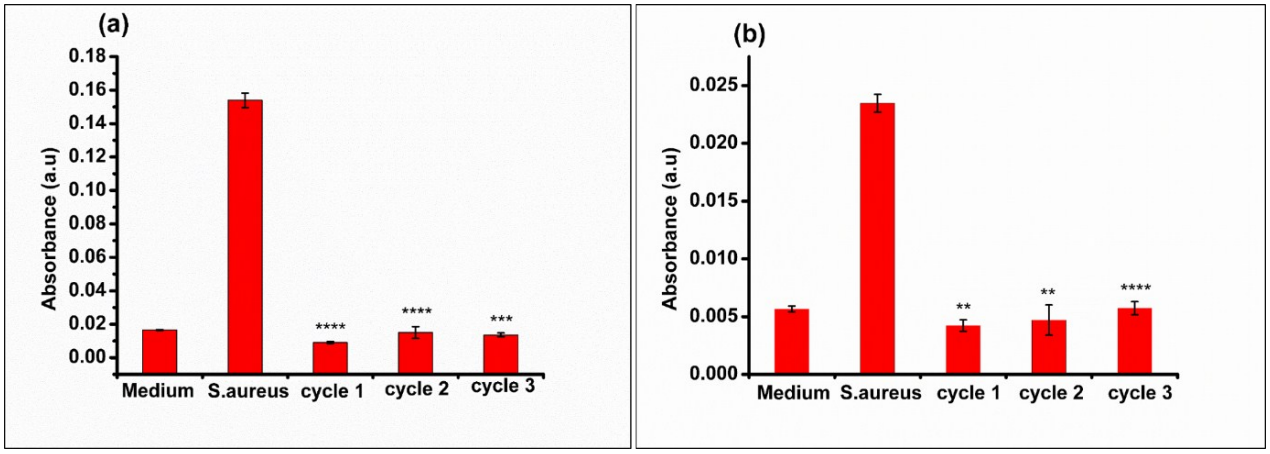


**Fig.S6** Antibacterial study of nanofibrous membrane by optical density analysis (a) NB medium and (b) Dextrose medium

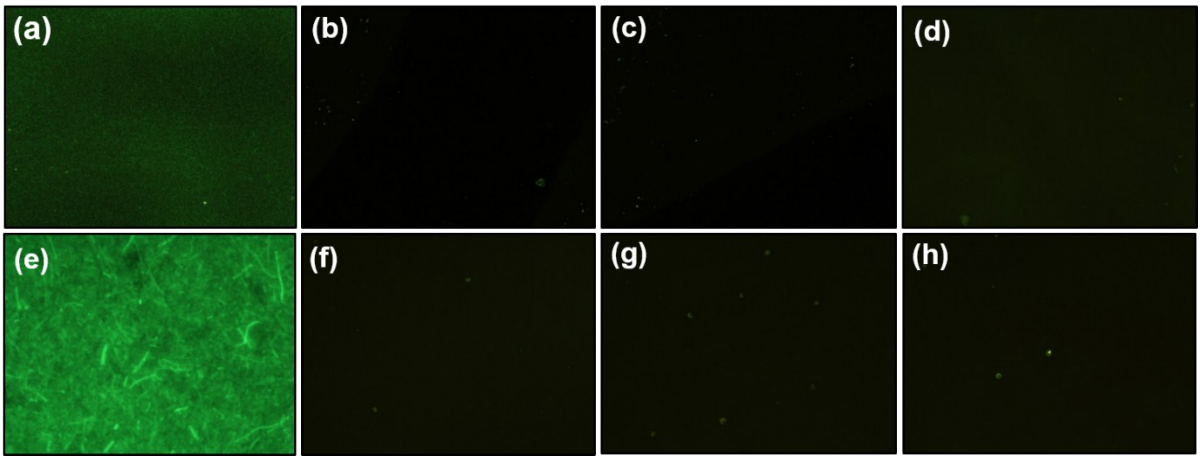


**Fig.S7** Fluorescence microscopy analysis of filtration study of GFP *E.coli* with different media (a-d) Dextrose and (e-h) Luria Bertani

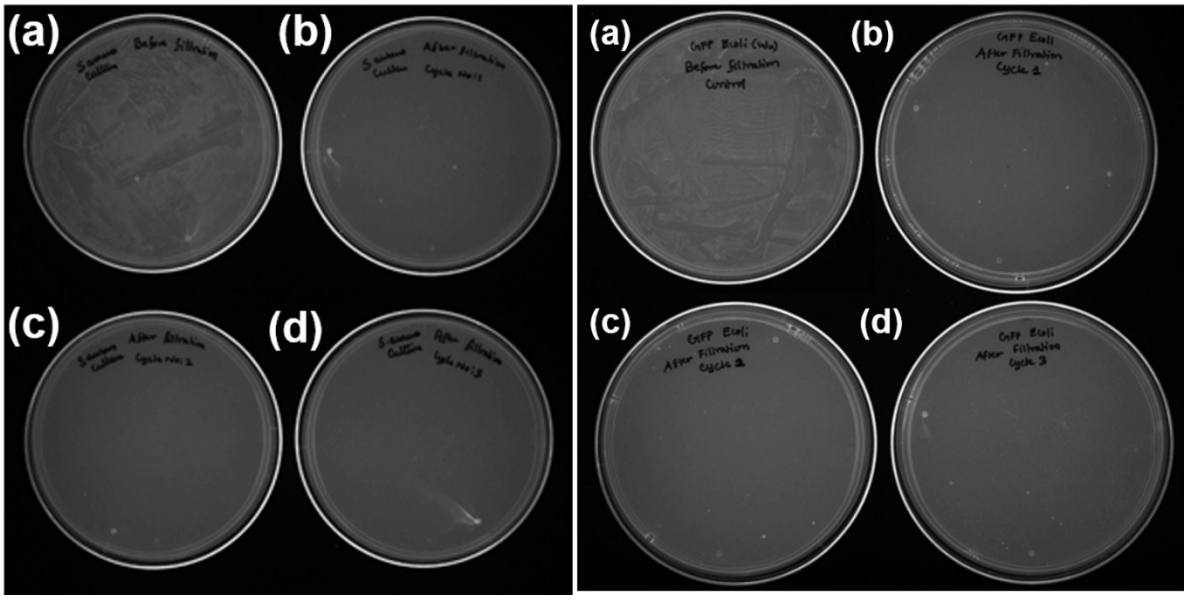


**Fig.S8** Antibacterial studies of nanofibrous membrane treated bacteria by colony counting method against *S.aureus* and GFP *E.coli*

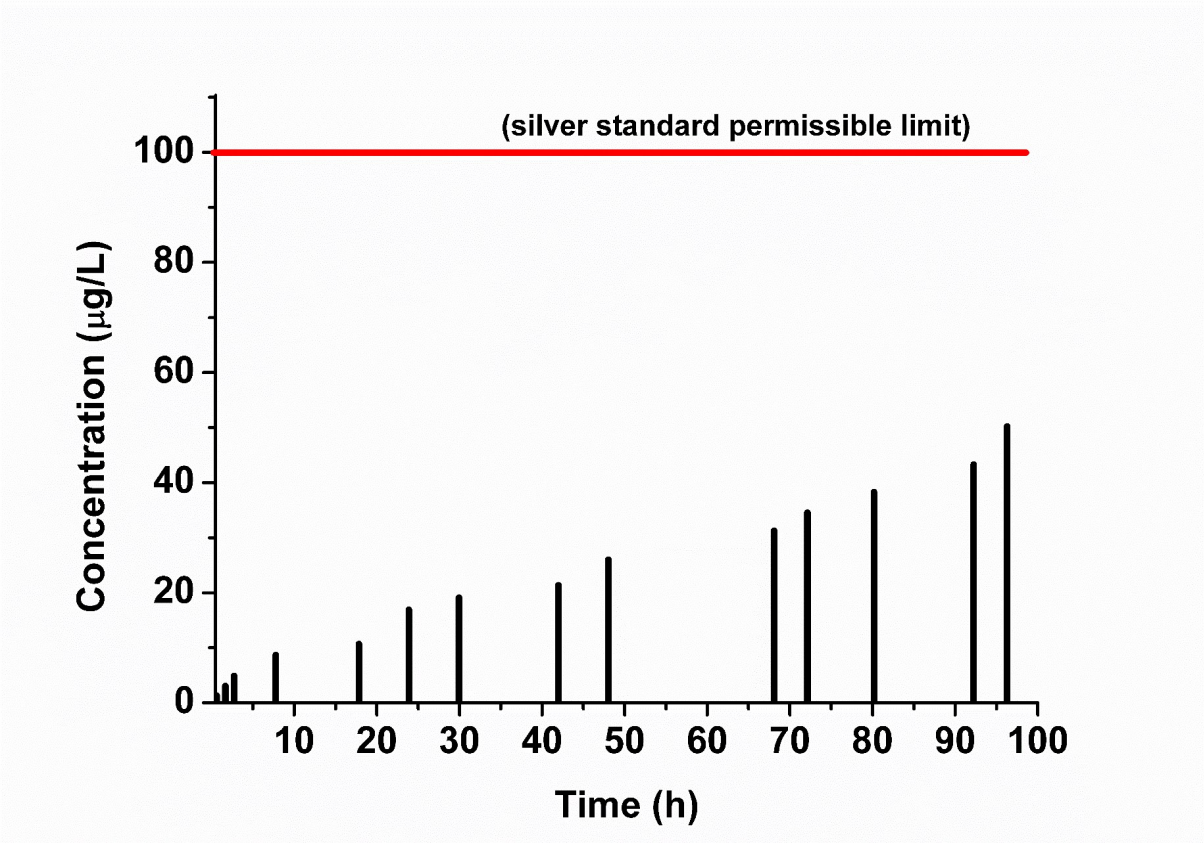


**Fig.S9** Cumulative release study of silver ions from the nanofibrous membrane