Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary information

One-step formation of three-dimensional macroporous bacteria biofilm sponge as a novel approach for preparation of bioreactor for bioremediation and green treatment of water.

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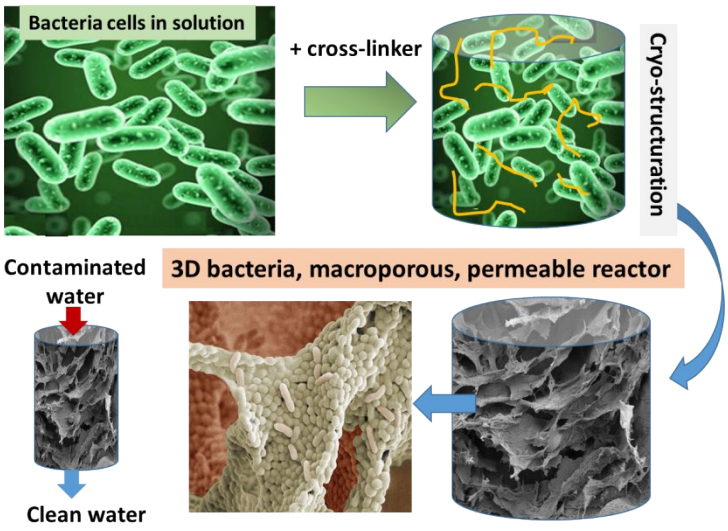
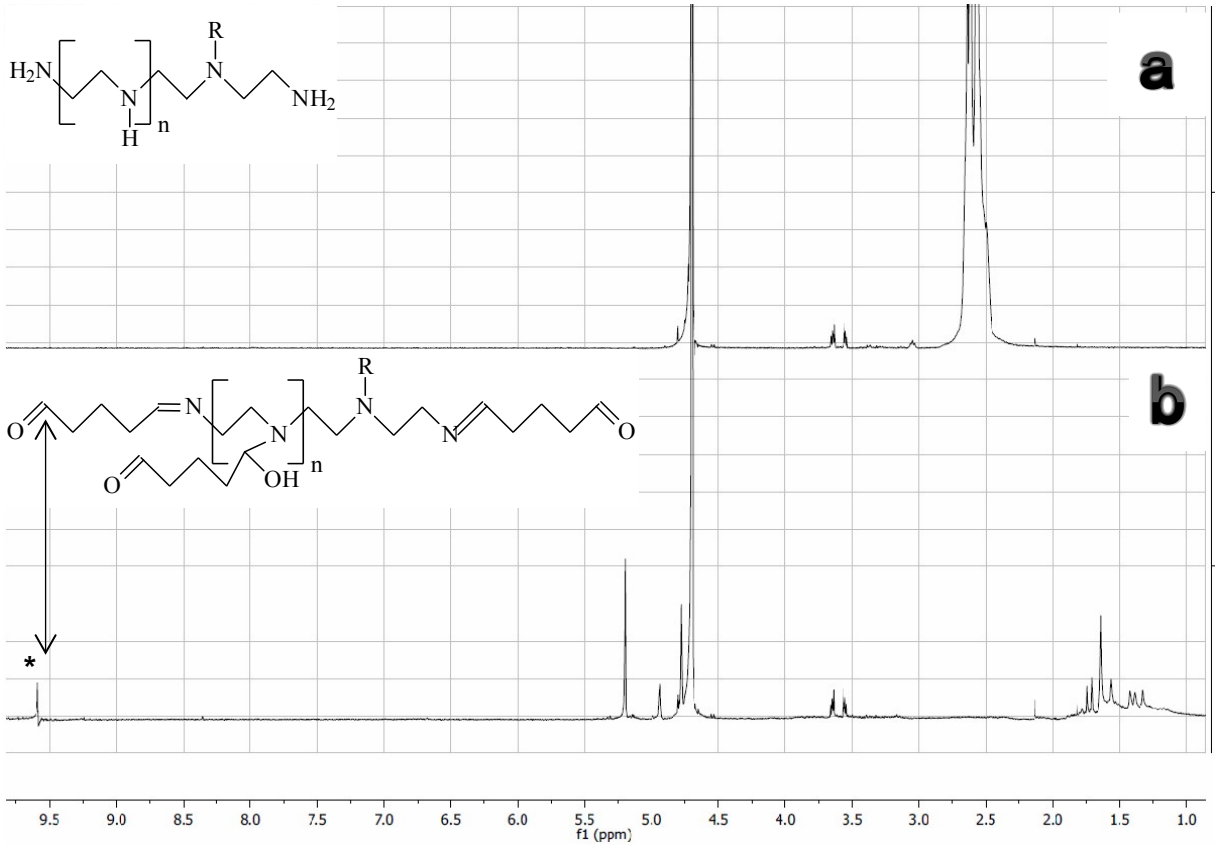
Graphical abstract



Polymer analysis.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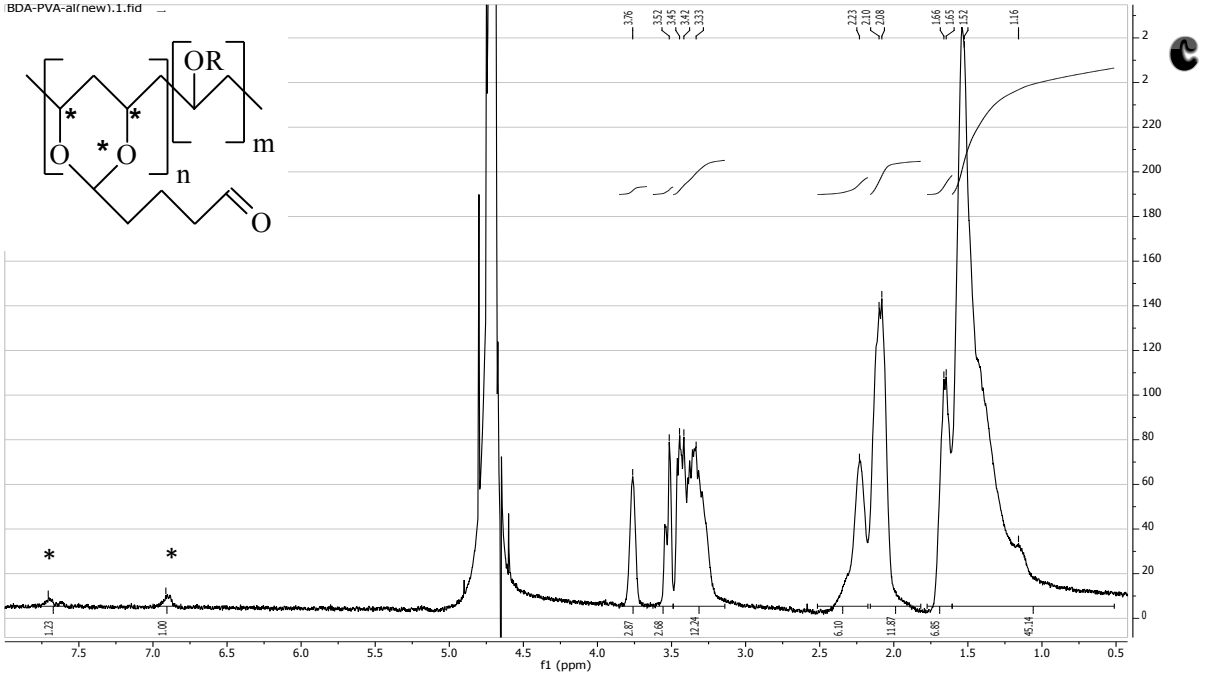
c
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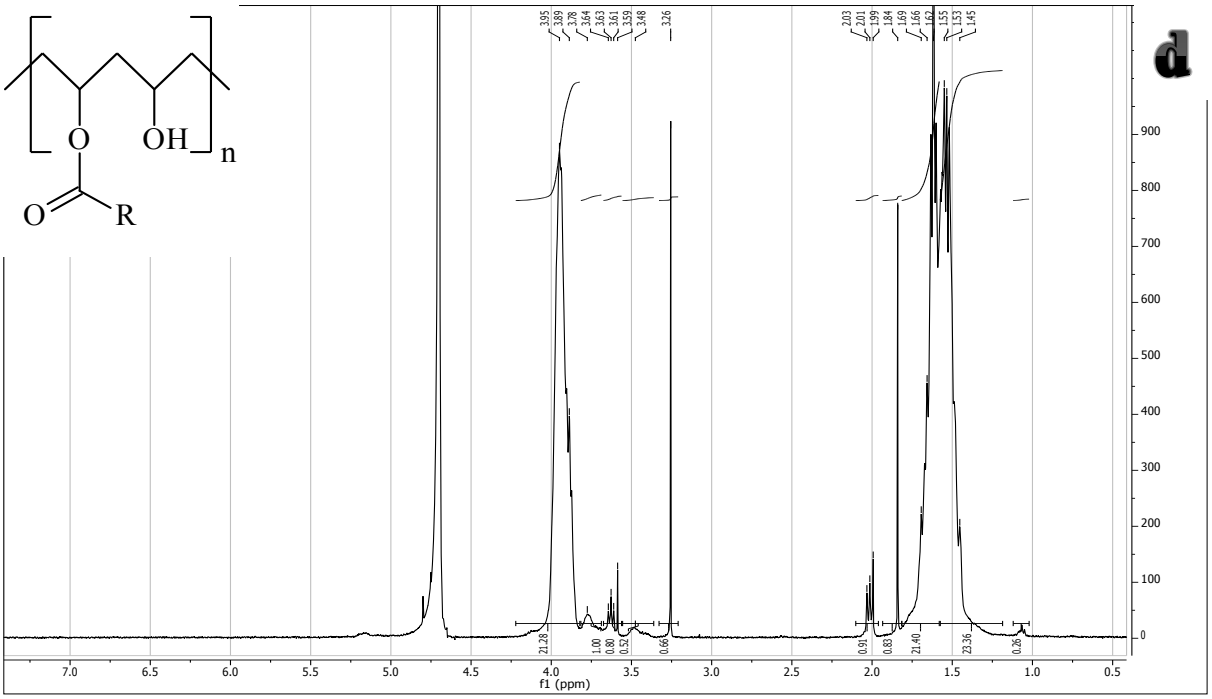
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1.55
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1.45
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200
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0.66
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f1 (ppm)

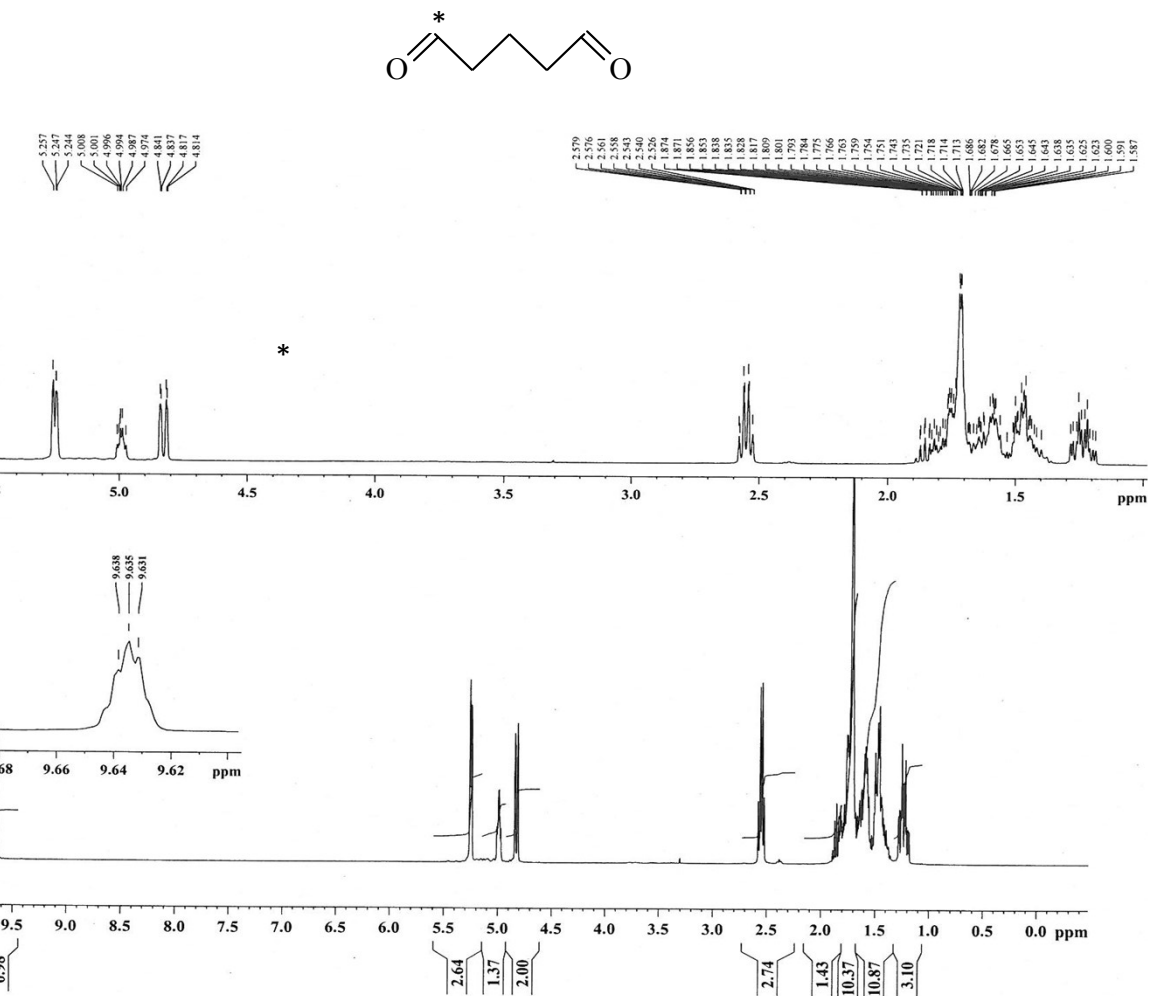

Fig. S1. H-NMR-spectra of a) PEI, b) PEI-al, c) PVA-al, d) PVA, e) glutaraldehyde in D_2O.

B

-C(=O)**H**

↓

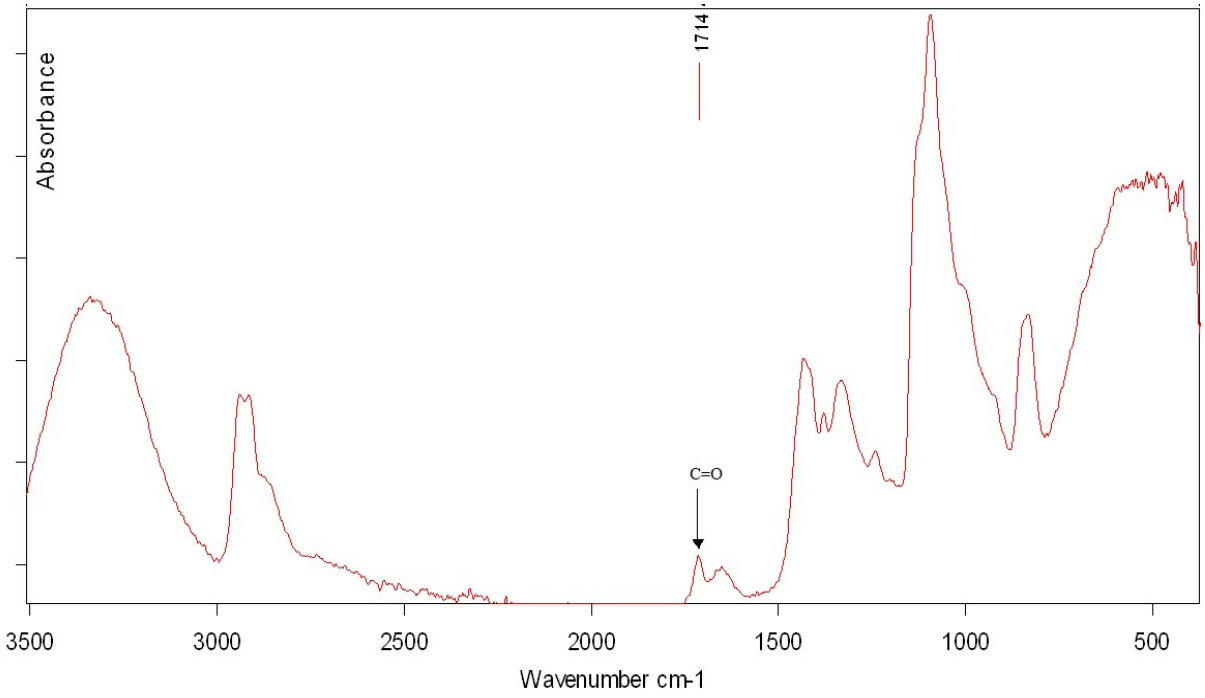

Figure S2. FTIR-spectrum of PVA-al

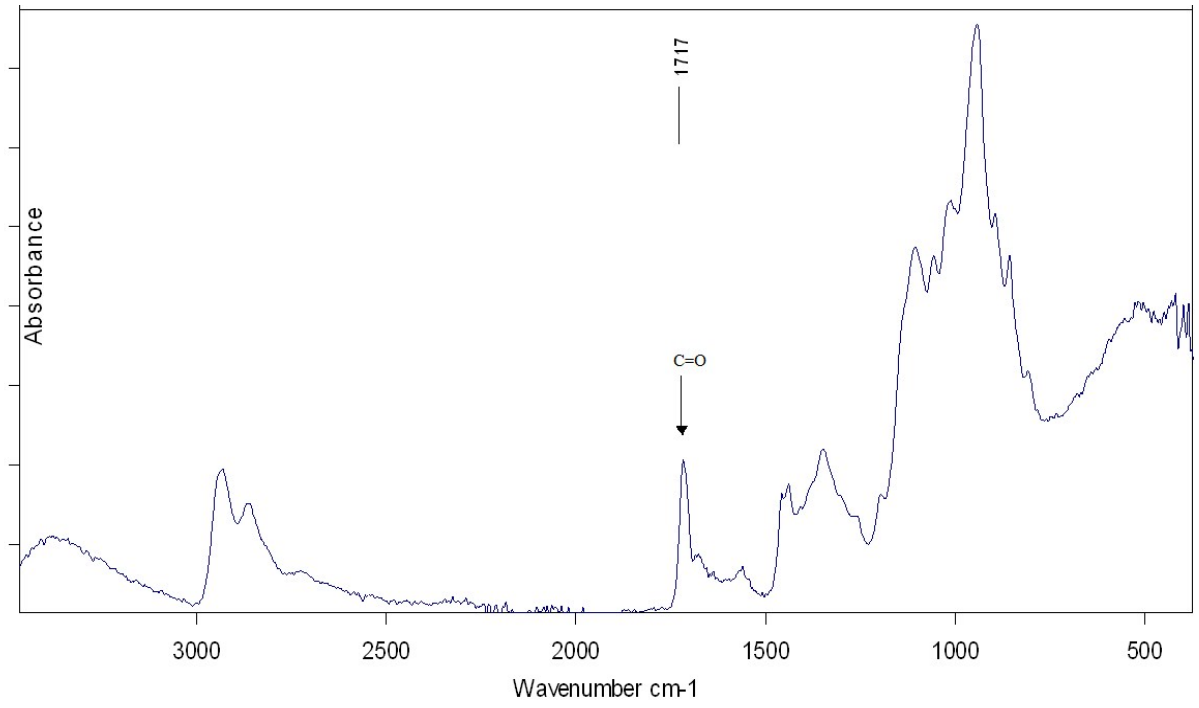

Figure S3. FTIR-spectrum of PEI-al.

HPLC settings and analysis.

Mobile phase 1% v/v acetic acid in water (C) and 1% v/v acetic acid in methanol (D). The method details: column temperature 45C, sample temperature 25C, C) Gradient Start at 75.0, End at 44.0%, D) Gradient Start at 25.0, End at 56.0% for 9.5minutes, and at composition 44%-56% C-D for 5min. C) Gradient Start at 44.0, End at 0.0% with duration of 1.0 min and D) Gradient Start at 56.0%, End at 100.0%, for 1.0min. 5 minutes at 100% of CH3OH&1% HAc. C) Gradient Start at 0.0, End at 75.0% for 1.0min; D) Gradient Start at 100.0, End at 25.0% with duration of 1.0min.

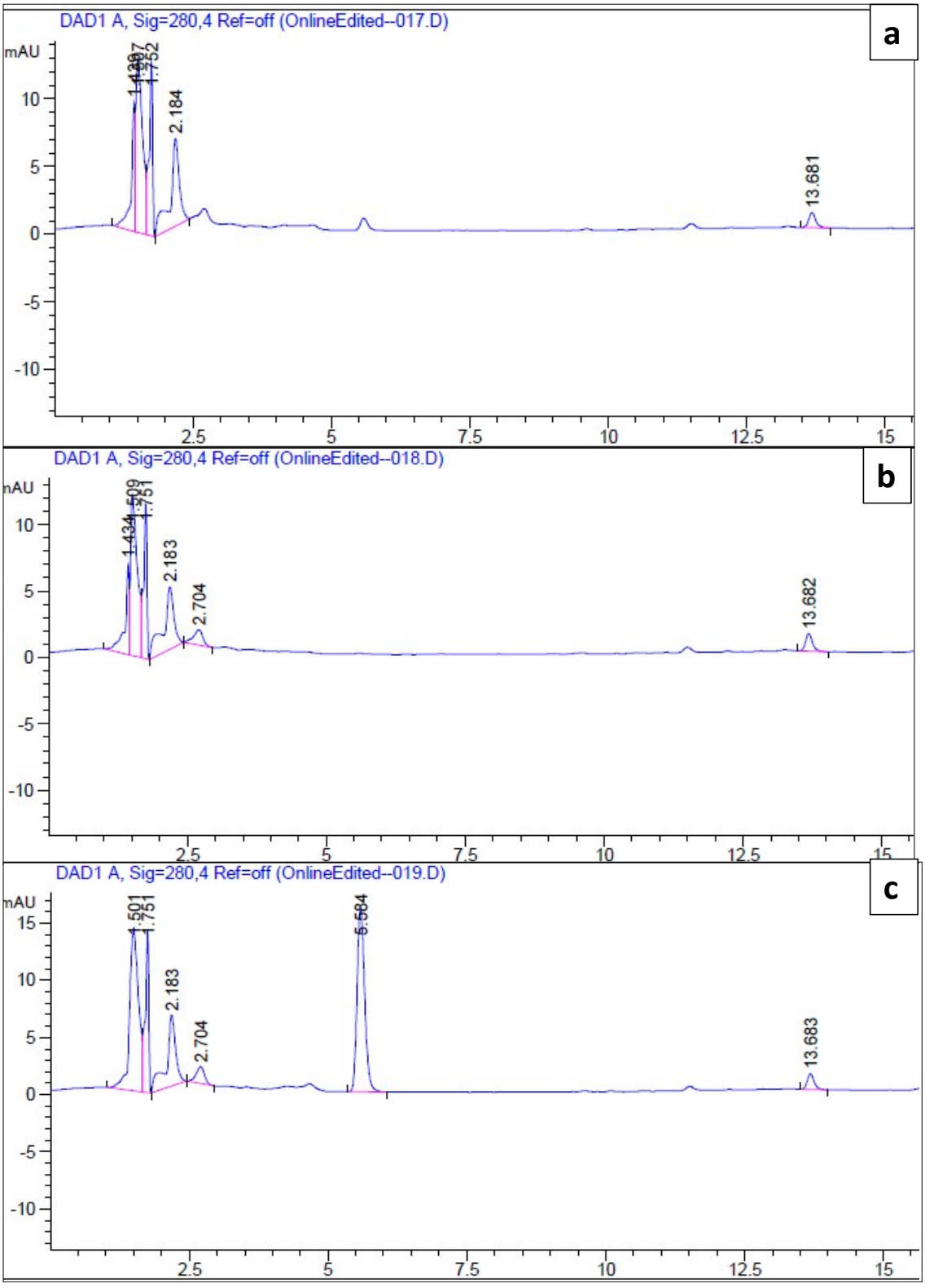

Figure S4. HPLC chromatogram of the solution after phenol degradation by the cryogel composed of: a) mixed bacteria strains *Rhodococcus koreensis and Pseudomonas mendocina;* b) *Rhodococcus koreensis c) Pseudomonas mendocina*.

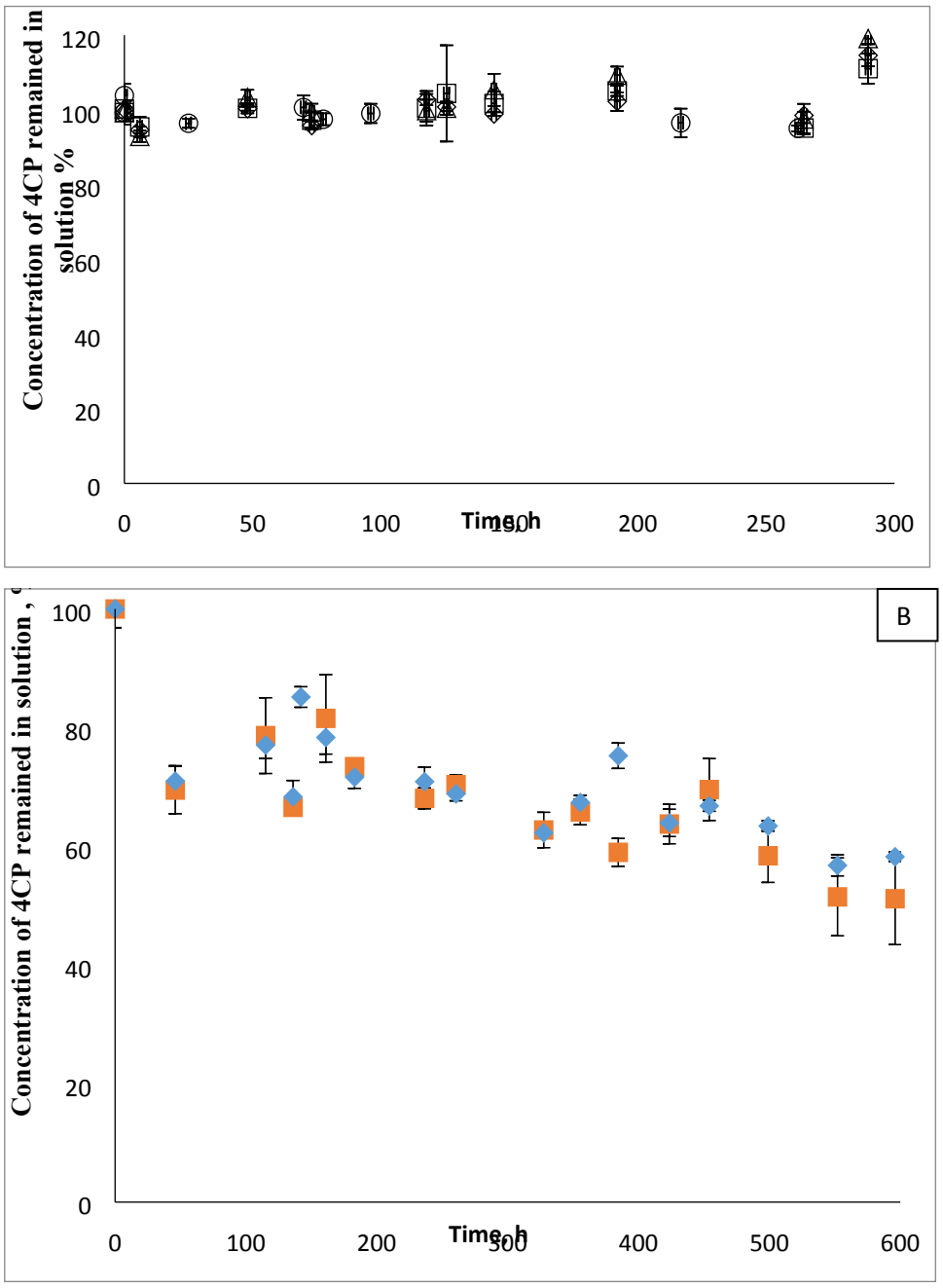

Figure S5. Degradation kinetic of 4CP (V 40ml 50mg/L) in 25mM carbonate buffer**,** dynamic mode (shaking at 150 rpm): A) suspension of free *Rhodococcus koreensis* commercial(triangle); *Rhodococcus koreensis* 4CP adapted(square); *Pseudomonas mendocina* commercial(circle) *Pseudomonas mendocina* 4CP adapted number of cell $0.7x10^8$ per sample (n=3). B) Cryogels Pseudomonas PVA-al 1.7% (square), Pseudomonas PVA-al –PEI-al 0.6-0.5 % (rhomb).

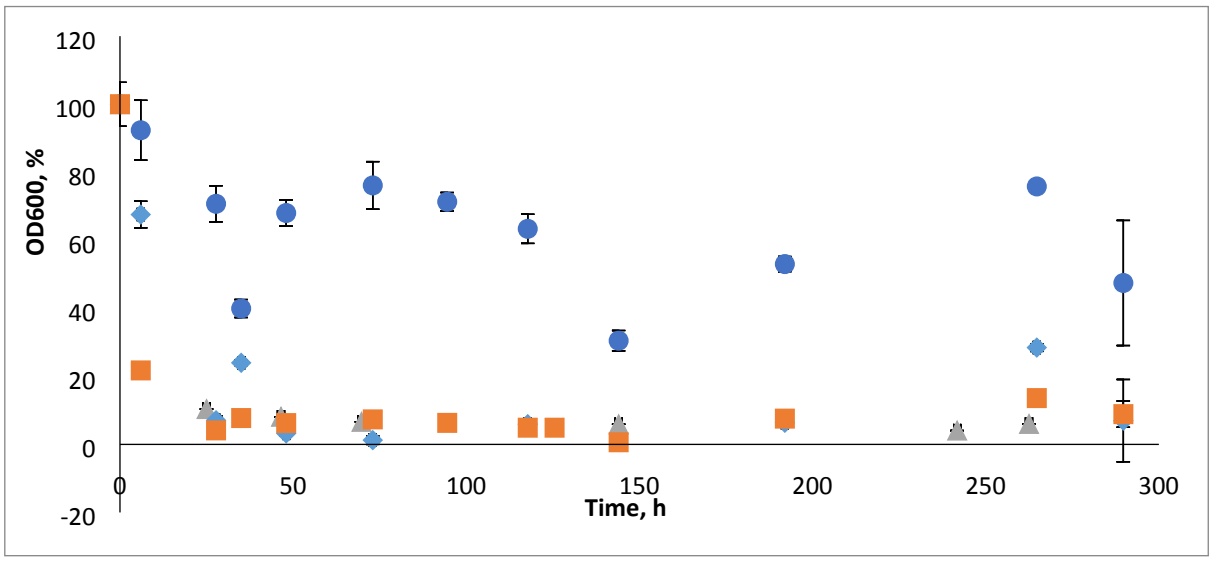

Figure S6. Kinetic of change of viable bacteria in the 50 mg/L of 4CP solution in 25 mM carbonate buffer in a dynamic mode (shaking at 150 rpm): *Pseudomonas mendocina* adapted to phenol (triangle); *Pseudomonas mendocina* commercial (circle); *Rhodococcus koreensis* (square) and *Rhodococcus koreensis adapted to phenol(rhomb)*.