Supporting Information

Exploring the antifouling effect of elastic deformation by DEM-CFD coupling simulation
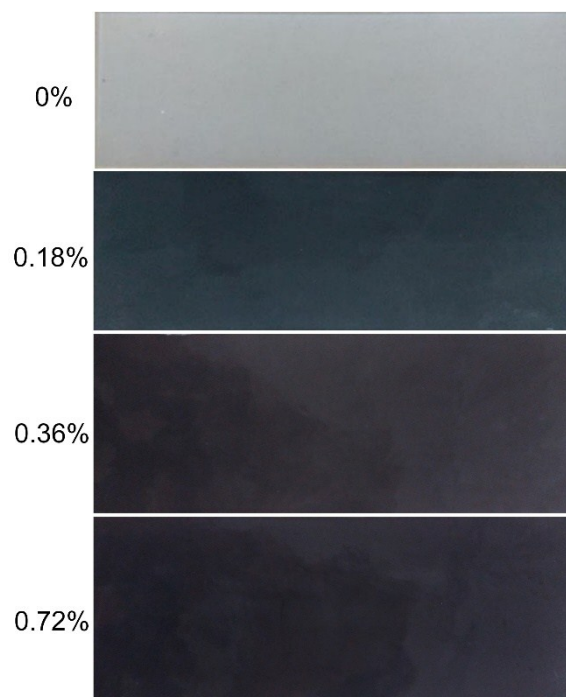

Figure S1. The elastic film of pristine SE film (0 wt%) and GSE film with different graphene content, the content of graphene was 0.18 wt%, 0.36 wt% and 0.72 wt%, respectively. Photographs were captured using a Canon digital camera.
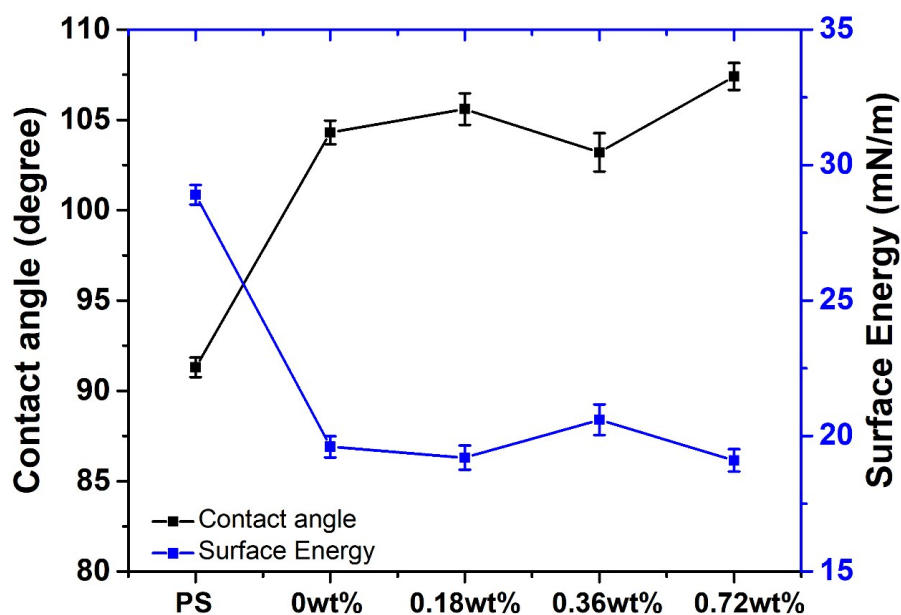

Figure S2. Contact angle and surface energy of rigid surface (PS sheet) and elastic film of GSE with different graphene content (0 wt%~0.72 wt%).
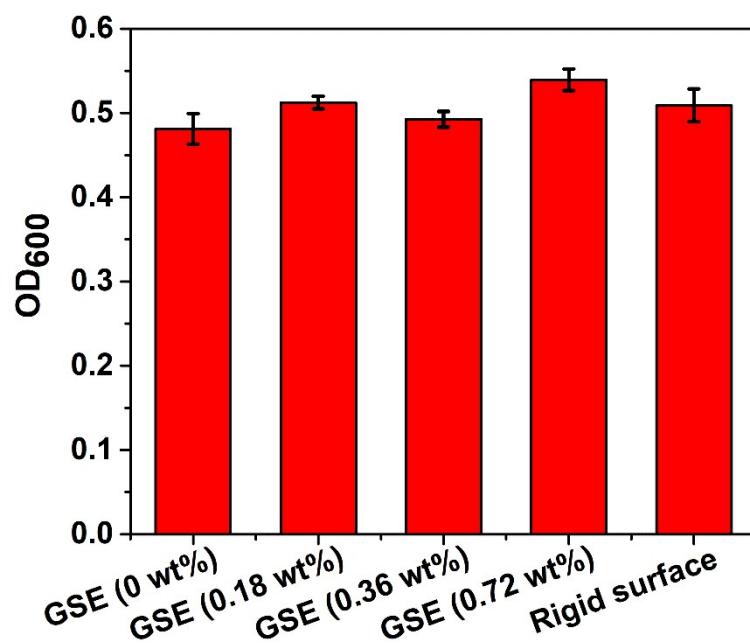
Figure S3. The quantities of bacteria adhering to elastic GSE film (0 wt%-0.72 wt%) and rigid surface (PS sheet) that incubated with bacteria for 24 h.
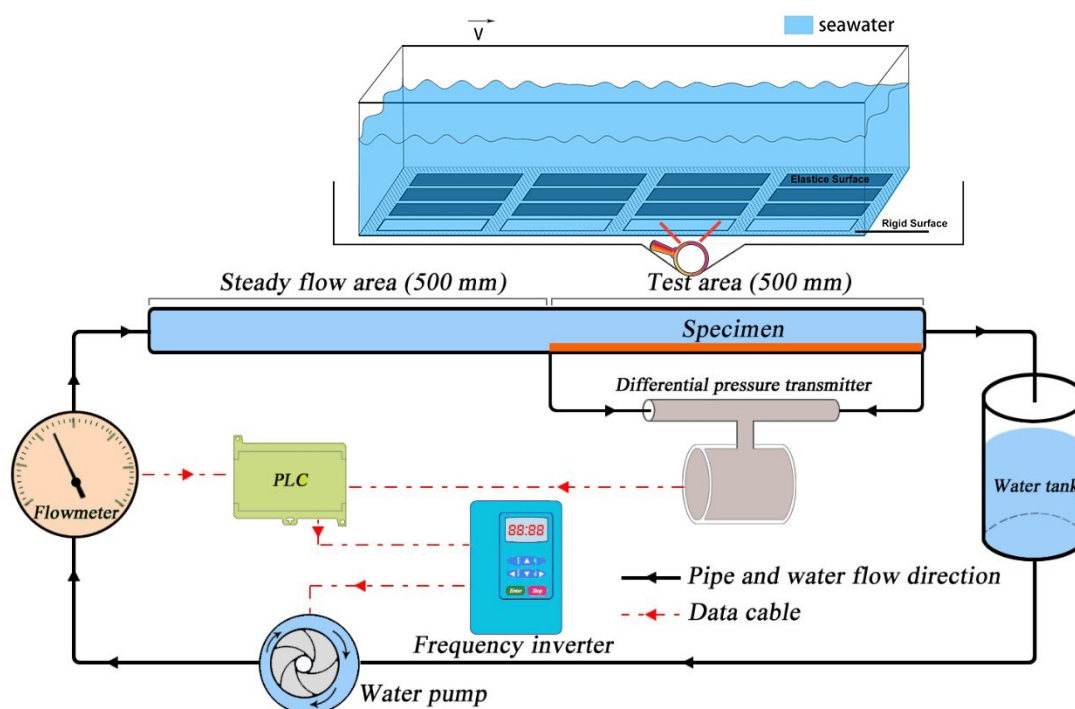

Figure S4. Schematic illustration of the flowing water system simulating marine environment. Samples were placed in the bottom. The coatings were fixed in artificial seawater, the water flows on them at different speed about 1.0 m/s—2.5 m/s.
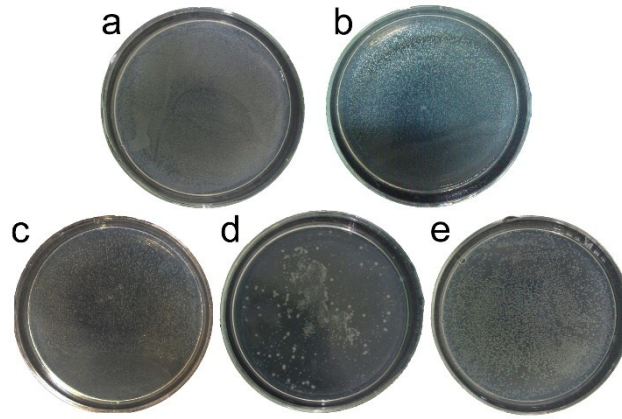
Figure S5. The plate samples showing colonies of *P. pantotrophus* incubated on (a) rigid surface and GSE antifouling surface with different graphene content, the content of graphene was (b) 0 wt%, (c) 0.18 wt%, (d) 0.36 wt% and (e) 0.72 wt%, respectively.
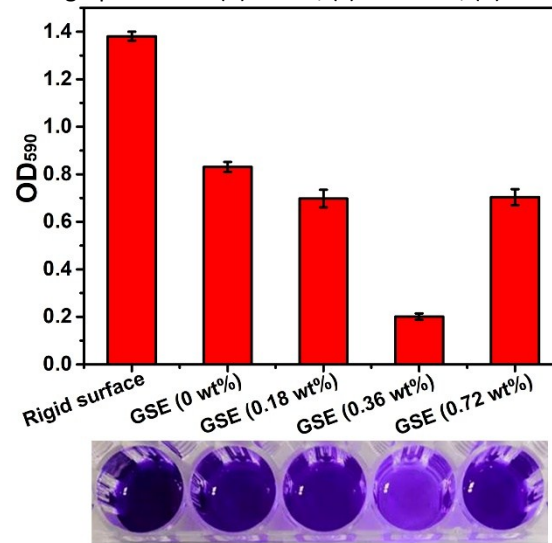

Figure S6. The efficacy of rigid surface and GSE on the inhibition of *P. pantotrophus* biofilms formation after 120 h incubation. The remaining biofilms were quantified by crystal violet staining.

Table S1. Parameters of different bacterial particle models.

Model Parameters	Spherical	Ellipsoidal	Combined spheroidal
Equivalent diameter (μm)	1.0	1.0	1.0
Density (kg/m^3)	1×10^3	1×10^3	1×10^3
Poisson's ratio	0.5	0.5	0.5
Shear modulus (Pa)	1.0×10^5	1.0×10^5	1.0×10^5

Table S2. Simulation parameters

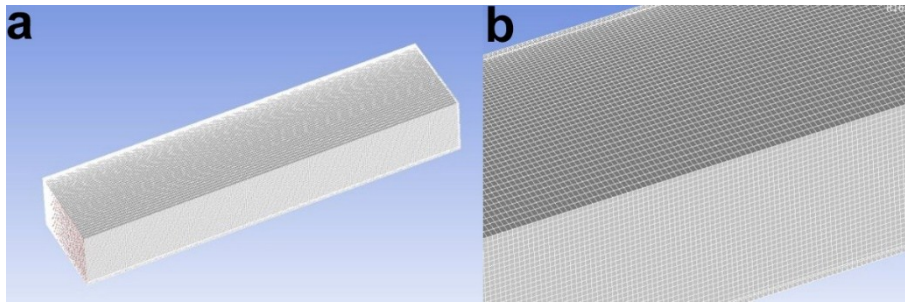| Particle distribution	Time step/s	Grid size/mm
Normal distribution	1.0×10^{-5}	$3R_{min}$

Figure S7. The area of CFD calculation. (a) Structured mesh and (b) local enlarged drawing.
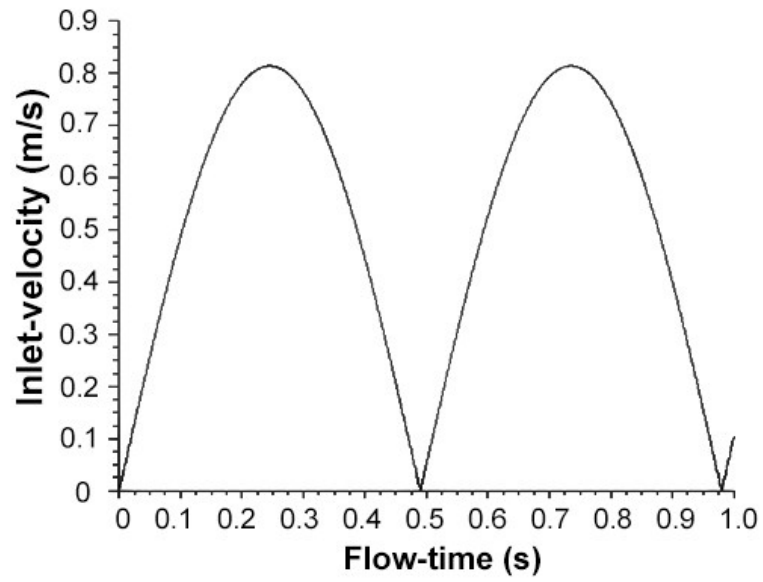

Figure S8. The relationship between inlet velocity and flow time.
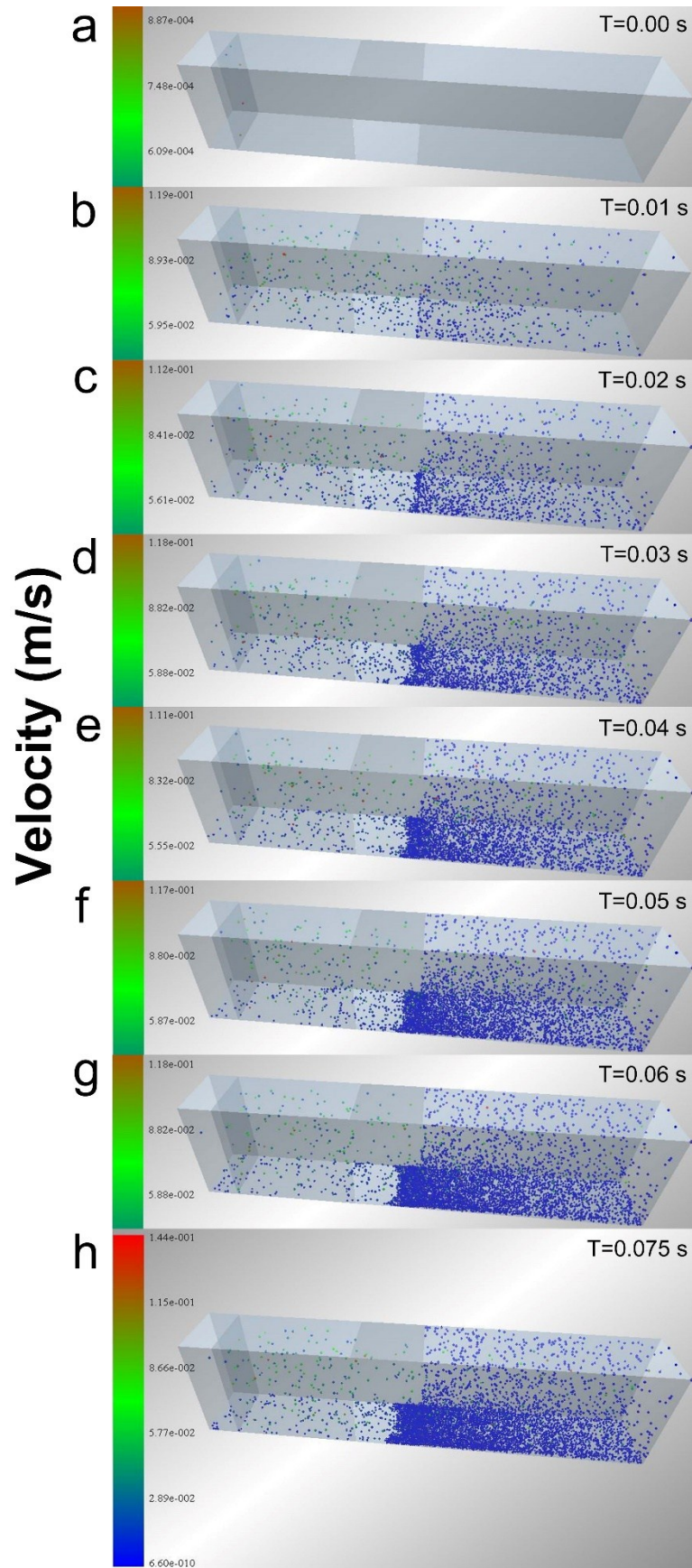
Figure S9. Bacterial adhesion on elastic wall and rigid wall at different time. The colour scale is related to the velocity of particles (red, green and blue particles). Due to the limitation of image size, only one picture shows the complete colour scale (h).