Supporting Information

Antifouling behavior of titania-silica-reduced graphene oxide nanocomposites as coatings for marine application

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The bacterial adhesion (E.coli) onto the uncoated and coated substrates was investigated further, under an optical microscope, and the results are shown below in Fig. S1.

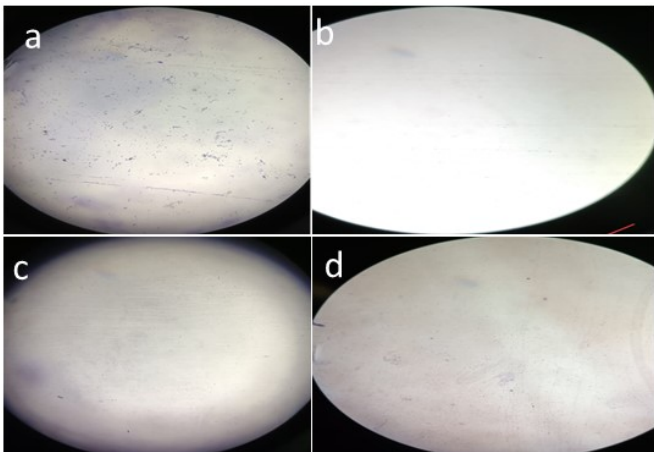

Fig. S1. Bacterial adhesion (E.coli) to the glass slides (a) uncoated, and glass slides coated with (b) TS-RGO-0.75 (c) TS-RGO-1.5 and (d) TS-RGO-3 nanocomposites, after exposure to bacterial suspension for 24 hours.

Fig. S2 represents the photographs of the prepared titania and silica sols.

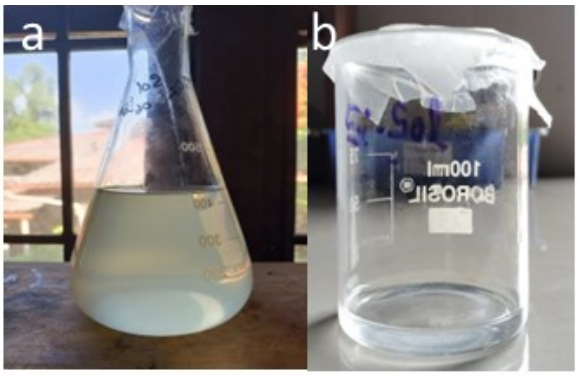

Fig. S2. Photographs of the as-synthesized (a) titania sol and (b) silica sol.

Photographs of the as-synthesized graphene oxide powder and nanocomposite sol of titania-silica-graphene oxide is shown in Fig. S3.

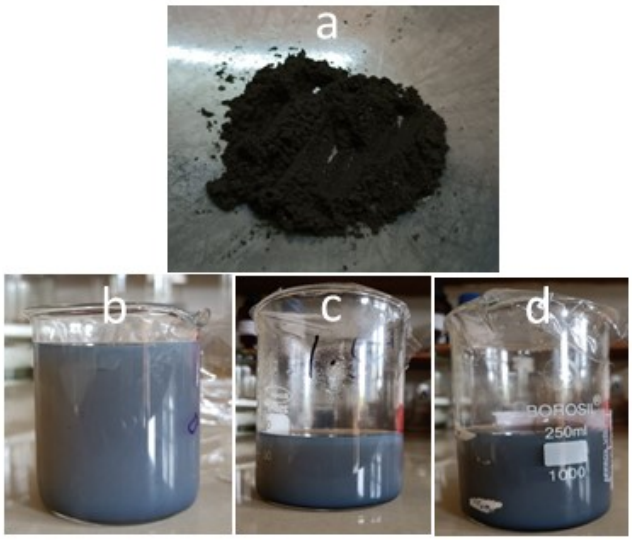

Fig. S3. Photograph of the (a) as-synthesized graphene oxide powder and nanocomposite sol of titania-silica-graphene oxide (b) TS-GO-0.75 (c) TS-GO-1.5 and (d) TS-GO-3.

Table S1 shows the biofilm inhibition efficiency of the as synthesized GO and GO heat treated at 400 ℃ in the presence of marine bacteria, E.coli, Freshwater Algae and Marine Algae (isolated in the laboratory from field samples) for a period of 48 hours.

Table S1. Biofilm inhibition assay of the as-synthesized GO and GO heat-treated at 400 °C at different concentrations in the presence of Marine Bacteria, E. coli, Marine Algae and Freshwater Algae, for about 48 hours.

Experimental Details	OD values at different concentrations			Biofilm Inhibition (%)		
	100 ppm	200 ppm	400 ppm	100 ppm	200 ppm	400 ppm
GO + Marine Bacteria	1.9902	0.4287	0.3186	48.55	88.92	91.76
GO + E.coli	1.7995	1.0328	0.0823	14.93	51.17	96.1
GO+Freshwater Algae	1.7631	1.5315	3.2510	33.21	41.99	-23.14
GO+Marine Algae	0.5742	0.2708	0.0533	78.17	89.71	97.97
GO-400◦C + Marine	2.0489	--	--	47.03	--	--

Bacteria						
GO-400◦C +E. coli	1.2566	--	--	40.59	--	--
GO-400◦C +Freshwater Algae	0.9279	--	--	64.85	--	--
GO-400◦C +Marine Algae	1.5896	--	--	39.59	--	--
Marine Bacteria-Control	3.8683	3.8683	3.8683	0	0	0
E. coli-Control	2.1153	2.1153	2.1153	0	0	0
Freshwater Algae-Control	2.6399	2.6399	2.6399	0	0	0
Marine Algae-Control	2.6314	2.6314	2.6314	0	0	0

Adhesion assay of freshwater and marine algae was evaluated by dipping the as-prepared coatings and the bare glass slides separately into the marine and freshwater algal suspensions of *Chlorella sp*. as shown in Fig. S4.

Fig. S4. Glass slides dipped in a marine algal suspension.