

Supporting information

Synthesis of CMC polymer

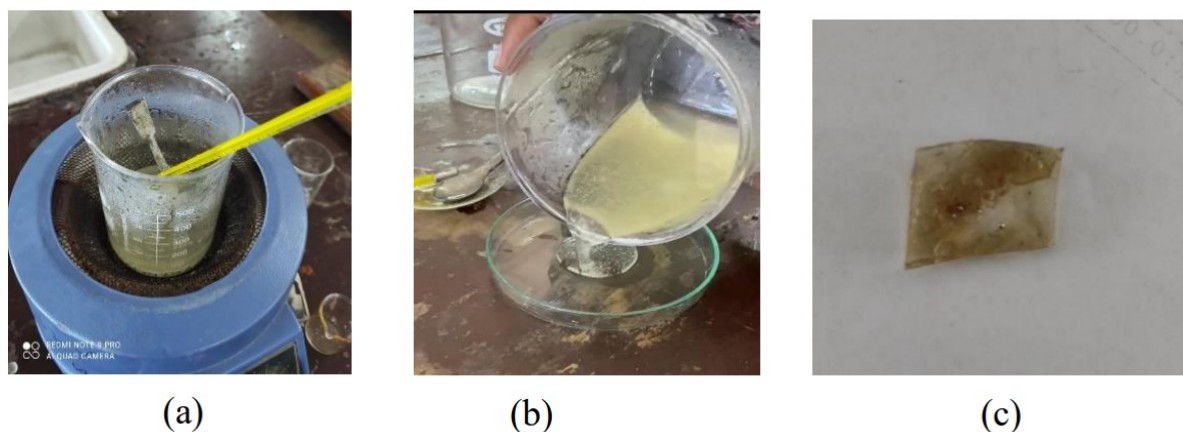


Figure S1: (a) Stirring process of polymer solution. (b) Pouring of final polymer solution into Petri dish. (c) Piece of final membrane (after being kept for 24 hours in oven at 60° C)

Synthesis of Graphene Oxide

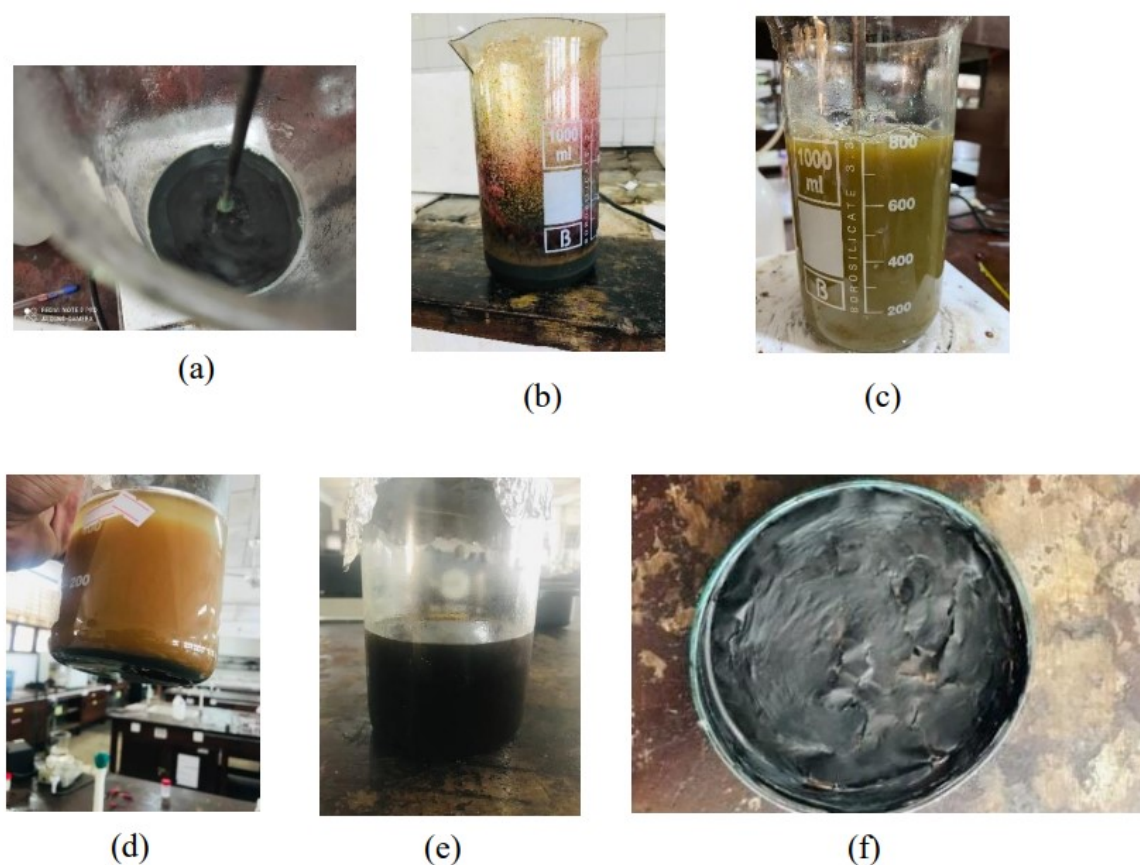


Figure S2: (a) Mechanical stirring process of potassium permanganate added dark green solution. (b) Dark purple colour solution after adding potassium permanganate. (c) The yellowish gold colour solution after adding Hydrogen peroxide. (d) Yellowish colour solution after being kept in the water for 24 hours. (e) graphene oxide stock solution after the washing process. (f) Graphene oxide thin films after being kept the stock solution in an oven at 80°C for 2 hours

Synthesis of CMC/GO/Aloe vera composite



(a)

(b)

Figure S3: (a) Heating GO / Aloe vera /distilled water mixture up to 80° C (b)Synthesized CMC/GO/Aloe vera composite at 60 °C

Table S1: Water uptake calculation of differently aged banana leaves

Age of banana leaf	Trial number	Initial weight $\pm 0.0005 \text{ g}$	Average initial weight $\pm 0.0005 \text{ g}$	Final weight $\pm 0.0005 \text{ g}$	Weight difference $\pm 0.0005 \text{ g}$	Average weight difference $\pm 0.0005 \text{ g}$
Day 1	1	0.0557	0.0559	0.0875	0.0318	0.0322
	2	0.0560		0.0886	0.0326	
Day 7	1	0.0476	0.0474	0.0896	0.0420	0.0476
	2	0.0472		0.1004	0.0532	
Day 14	1	0.0343	0.0346	0.1407	0.1064	0.1028
	2	0.0349		0.1341	0.0992	
Day 21	1	0.0249	0.0250	0.1101	0.0852	0.0846
	2	0.0250		0.1090	0.0840	
Day 28	1	0.0256	0.0253	0.0840	0.0584	0.0586
	2	0.0250		0.0837	0.0587	

Table S2: Calculation of desalination percentages for different composites

Type of composite	Trial number	Initial conductivity $\pm 0.05 \text{ mS cm}^{-1}$	Final conductivity (After 30 min.) $\pm 0.05 \text{ mS cm}^{-1}$	Conductivity difference $\pm 0.05 \text{ mS cm}^{-1}$	Desalinated percentage (%)
CMC	1	40.39	23.76	16.63	41.18
	2	39.96	24.51	15.45	38.67
CMC/Aloe vera	1	40.18	21.03	19.15	47.66
	2	39.17	19.63	19.54	49.89
CMC/GO	1	41.66	15.98	25.68	61.63
	2	40.54	14.57	25.97	64.06
CMC/GO (50%)/ Aloe vera	1	40.52	10.12	30.40	75.03
	2	40.89	10.93	29.96	73.26

XRD Analysis of synthesized composite

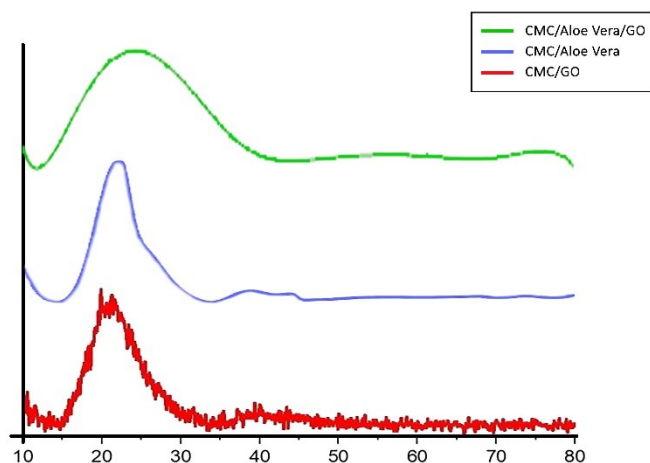


Figure S4: Merged XRD analysis of synthesized composites

SEM Analysis of synthesized composite

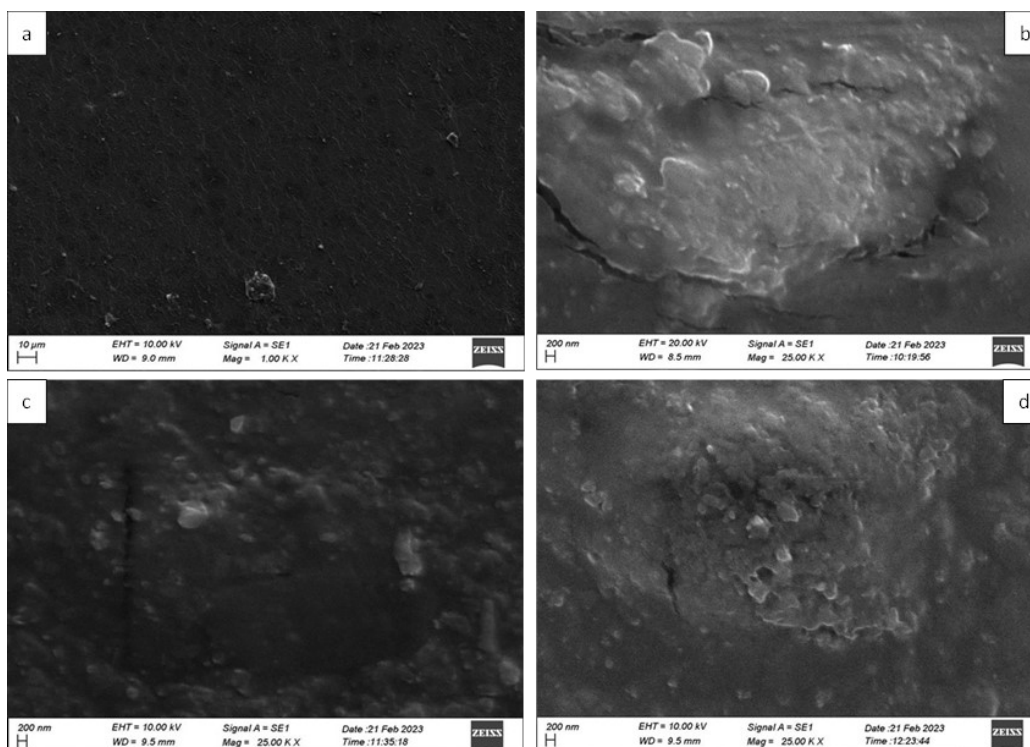


Figure S5: SEM analysis of synthesized composites (a)CMC (b)CMC/Aloe vera (c)CMC/GO (d)CMC/GO (50%)/Aloe vera