

Table S1: Cost estimation of Fuller's earth clay ceramic membrane ¹

S. No.	Items	Cost (\$/m ²)														
1.	Raw material cost Price of fuller's earth clay = ₹500 /kg Clay utilized to fabricate a membrane having an area of $2.922 \times 10^{-3} \text{ m}^2 = 20\text{g}$ Raw material price to fabricate one ceramic membrane = 44.486 \$/ m² Currency conversion used for the entire calculations is ₹1 = \$ 0.013 Round-off value of raw material price	45														
2.	Manpower cost Manpower cost = ₹500 / day Consider, working hours as 8 h per day. In the present work, 8 h is required to fabricate 100 membranes Therefore, $\frac{\text{manpower cost}}{\text{Cost per hour} \times \text{No. of working hours}} =$ $\frac{\text{No. of membranes} \times \text{Unit membrane area}}$	13.9														
3.	Electricity cost Electricity tariff charge = ₹7.9/kWh Consumption of electricity = $\frac{\text{No. of working hours} \times \text{Electricity tariff charge}}{\text{No. of membranes} \times \text{Unit area of membrane}}$ <table><tr><th>Equipment</th><th>Cost (\$/ m²)</th></tr><tr><td>Hydraulic press</td><td>2.093</td></tr><tr><td>Hot air oven</td><td>12.649</td></tr><tr><td>Muffle furnace</td><td>6.578</td></tr><tr><td>Sonication bath</td><td>0.0877</td></tr><tr><td>Total</td><td>21.40</td></tr></table>	Equipment	Cost (\$/ m ²)	Hydraulic press	2.093	Hot air oven	12.649	Muffle furnace	6.578	Sonication bath	0.0877	Total	21.40	21.40		
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4.	Equipment maintenance cost Equipment maintenance cost = $\frac{\text{Cost per hour} \times \text{No. of working hours}}{\text{No. of membranes} \times \text{Unit area of membrane}}$ <table><tr><th>Equipment</th><th>Cost (\$/ m²)</th></tr><tr><td>Circular mould</td><td>0.0729</td></tr><tr><td>Hydraulic press</td><td>3.848</td></tr><tr><td>Hot air oven</td><td>4.381</td></tr><tr><td>Muffle furnace</td><td>4.563</td></tr><tr><td>Sonication bath</td><td>0.221</td></tr><tr><td>Total</td><td>13.085</td></tr></table>	Equipment	Cost (\$/ m ²)	Circular mould	0.0729	Hydraulic press	3.848	Hot air oven	4.381	Muffle furnace	4.563	Sonication bath	0.221	Total	13.085	13.08
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5.	Laboratory cost Laboratory cost = 20% of manpower cost	2.78
6.	Miscellaneous cost Abrasive papers (SiC), distilled water (2 L), tissue rolls, and acetone (0.25 L)	2.87
Total cost		99.03
Round-off value of total manufacturing cost of the membrane		100

Table S2: Energy consumption for membrane fabrication process

Equipment	kWh
Hydraulic press	6.6
Hot air oven at 100 °C	22.5
Muffle furnace (Sintering at 850 °C)	17
Ultrasonication	0.5
	46.6

References

- 1 S. L. S. Rani and R. V. Kumar, *Mater. Sci. Eng. B*, 2022, **284**, 115877.