Membrane Technology

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Chapter 6
Membrane Characterization

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Chapter Description

- Aims
  - Understand membrane's characterization including flux, permeability, rejection and calculation of membrane module
- Expected Outcomes
  - Understand membrane's characterization in general.
- Other related Information

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Subtopics

6.1 Flux and membrane permeability

6.2 Calculation of number of module

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6.1 Flux and Membrane Permeability

- Example 1:
  Data obtained from one experiment using pure water is shown in Table 1. Calculate the flux ($L/m^2.h$) and permeability ($L/m^2.h.bar$) from the data. What type of membrane for this case? Please justify.

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6.1 Flux and Membrane Permeability

Sample collect at constant volume, V= 25 mL
Effective membrane diameter, d= 4 cm

Table 1

Pin(bar)	Pout(bar)	time
0	0	0
2	2.1	51min 29s
3	3.1	32min 6s
4	4.1	26min 17s
5	5.1	19min 46s
7	7.1	14min 9s
9	9.2	10min 48s

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6.1 Flux and Membrane Permeability

Pin(bar)	Pout(bar)	t(h)	Flux(L/m2.h)
0	0	0	0
2	2.1	0.8581	23.12232821
3	3.1	0.535	37.08648568
4	4.1	0.4381	45.2893628
5	5.1	0.3294	60.23457754
7	7.1	0.2358	84.14448618
9	9.2	0.18	110.2292769

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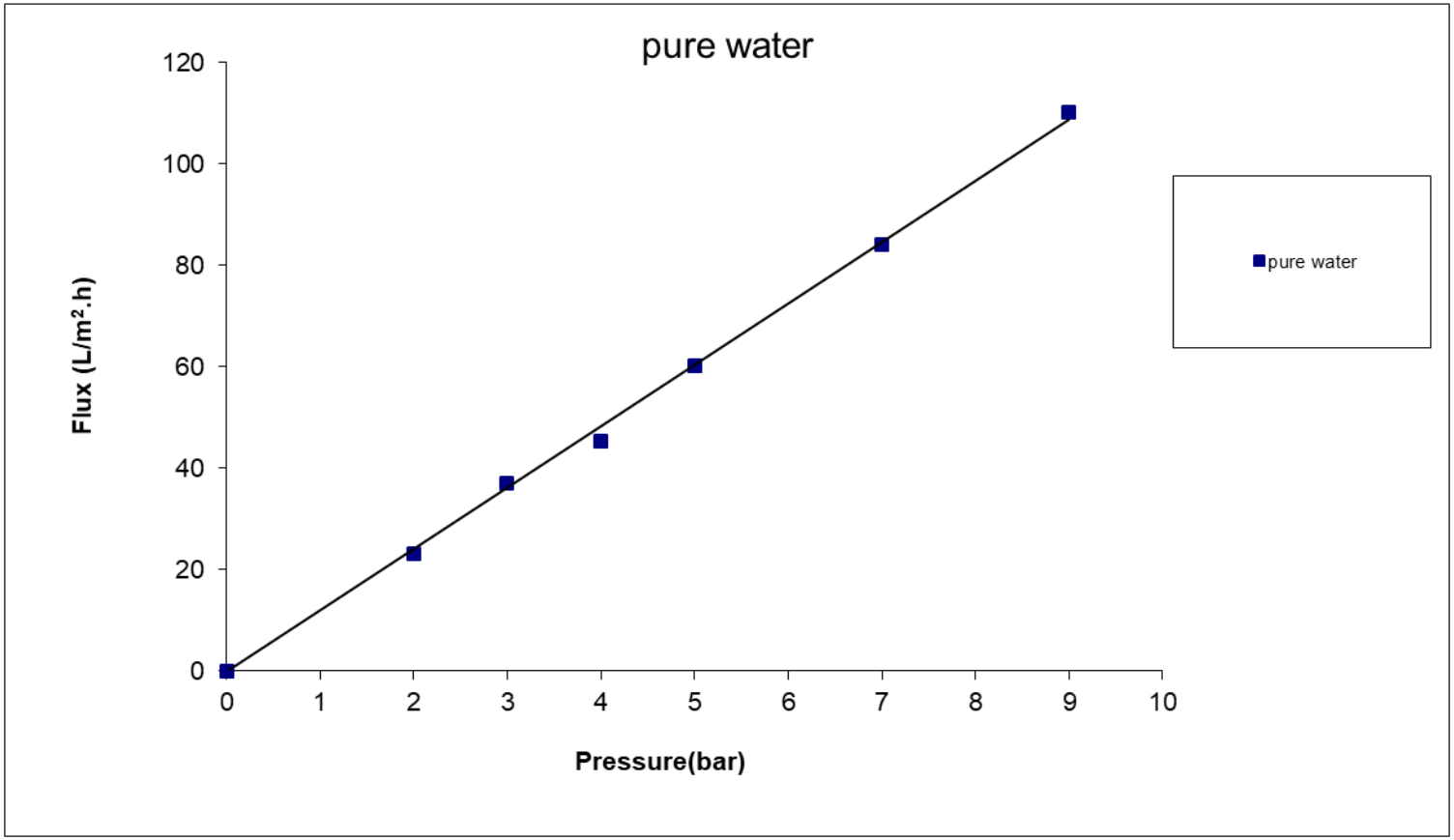
6.1 Flux and Membrane Permeability



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6.2 Calculation Number of Module

- An UF flat sheet membrane has a water permeability of Lp= 50 L/m^2.h.bar. The effective size of the flat sheet membrane is 0.5 m x 0.2 m in rectangle module. If the system is run at 5 bar and 25 ^oC and protein as a feed, how many number of modules are required in order to achieve permeate flow rate of 3 m^3/day.

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References

- Mulder, M. (2000) Basic Principles of Membrane Technology, second ed., Kluwer Academic Publishers, Dordrecht, The Netherlands.
- Baker, R.W. (2000) *Membrane Technology and Applications.* New York, Mc Graw-Hill.

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