

shown in fig. VIII - 8. A perforated central pipe is located in the center of the module through which the feed solution enters. In this concept the fibers are arranged in a loop and are potted on one side, the permeate side. One of the disadvantages of the 'outside-in' type is that channelling may occur. This means that the feed has a tendency to flow along a fixed path thus reducing the effective membrane surface area. With a central pipe, the feed solution is more uniformly distributed throughout the module so that the whole surface area is more effectively used.

The hollow fiber module is used when the feed stream is relatively clean, as in gas separation and pervaporation. Hollow fiber modules have also been used in the case of seawater desalination, another relatively clean feed stream. The module construction given in figure VIII - 8 (left figure) is that of a typical hyperfiltration module. In gas separation the module will be of the 'outside-in' type to avoid high pressure losses inside

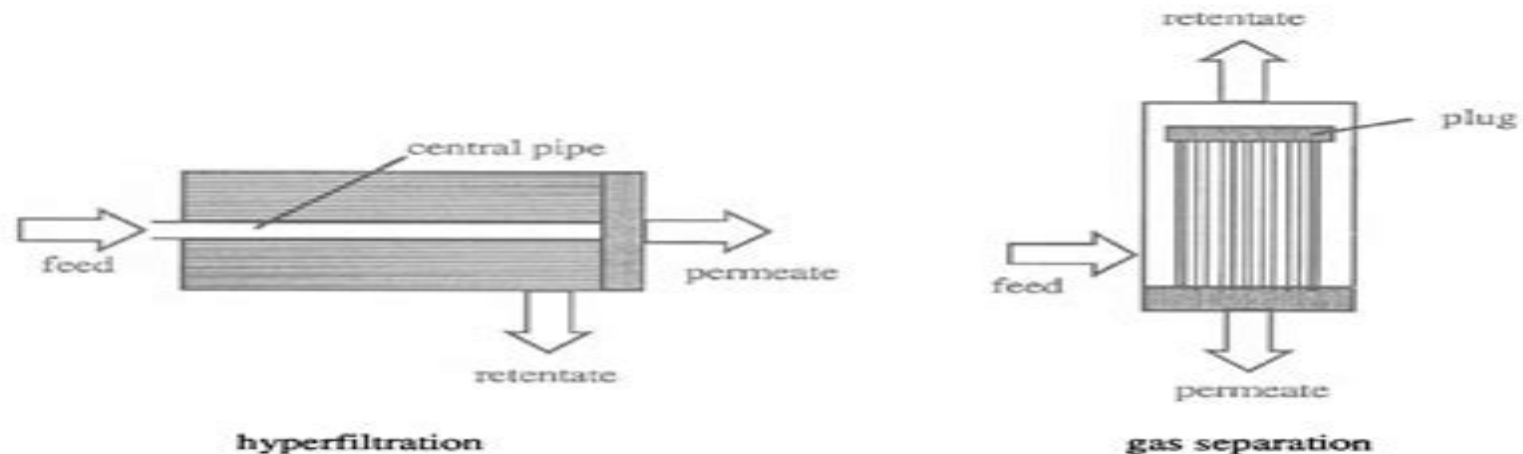


Figure VIII - 8. Special hollow fiber construction for hyperfiltration (left) and gas separation (right).

the fiber (see figure VIII - 8, right figure), whereas in pervaporation it is more advantageous to use the 'inside-out' type to avoid increase in permeate pressure within the fibers. (The 'outside-in' concept can also be used with short capillary fibers for pervaporation). Another advantage of the inside-out concept is that the very thin selective top layer is better protected, whereas a higher membrane area can be achieved with the outside-in concept.

VIII . 7 Comparison of module configurations

The choice of the module is mainly determined by economic considerations. This does not

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Membrane Technologies Katarzyna Staszak,Karolina Wieszczycza,Bartosz Tylkowski,2022-10-03 Membrane techniques are an excellent alternative to traditional methods of purification and separation This book covers issues related to the most recent developments in the field of membrane techniques The latest scientific research and their potential applications in industrial solutions are described In addition currents trends in food beverages technologies and biomedicine are discussed Moreover the book emphasizes recent advancements in design of membrane systems used either for separation or creation of mixtures from the perspective of industry 4 0 and data management **Membrane Technology:**

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