Protein fractionation by membrane processing: please be gentle

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Abstract:

This lecture discusses the process of protein fractionation by ultrafiltration considering the balance of forces that act in a protein near a porous membrane surface and the importance of selecting adequate conditions in order to assure the right transport conditions from the bulk stream to the membrane surface. The control of the transmembrane pressure / permeate flux applied is discussed in detail, as well as the implications of operating under controlled permeate flux, assuring subcritical flux conditions. This discussion will be illustrated with practical examples of protein fractionation, namely applied to the fractionation of proteins recovered from microalgae processing. The effect of protein processing with ultrafiltration membranes will be also discussed concerning the potential impact on the proteins' conformation. For this purpose, the use of natural fluorescence techniques and fluorescence anisotropy will be presented, making clear the importance of selecting adequate membrane materials and operating conditions that minimise changes of protein conformation and, ultimately, function.

Keywords: Protein fractionation; Subcritical flux; Protein conformation; Process monitoring