

## Application of Advanced Membrane Technology in the Food and Pharma Sector – the Journey from the Idea to Production

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A new optimised synthesis route was established for a product in the food and pharma sector at DSM. However, a new impurity in the intermediate production disturbed the further processing and needed to be removed. Several separation methods in the laboratory were investigated (e.g. thermal separation, crystallisation, adsorption etc.). However, only the separation with nanofiltration-membranes produced results with which an application later in production scale was possible [1].

This OSN (organic solvent nanofiltration) purification method is advanced, since a four-component-mixture must be processed: two solutes – the impurity and the precursor, and two organic solvents. Not only, the membrane and the operation conditions must be suitable to retain the impurity and at the same time provide a reasonable flux for the precursor. Also, the ratio of the two organic solvents must be kept in a narrow range where a sufficient solubility of the precursor is assured, despite the different permeation properties of the solvents. In addition, long-term effects regarding scaling on the membranes and precipitation behaviors have to be considered.

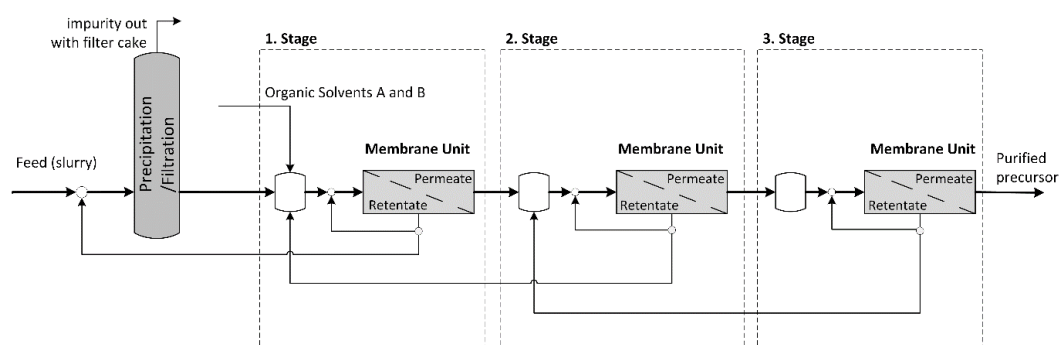


Figure 1. Three-staged process design of the OSN system

During lab and piloting trials a three-staged process was developed which combines a precipitation/filtration unit with a subsequent OSN unit and advanced recycle systems as shown in Figure 1. This process was constructed and commissioned this year in one of the production plants of DSM.

[1] Roman Goy, Maurus Marty, Jan Schuetz, Ralph Waechter, Julia Witte; Organic solvent nanofiltration of 7-dehydrocholesterol or 25-hydroxy-7-dehydrocholesterol or their oh protected forms; Patent Number: WO2021213988A1, 2021