

Membrane Assisted Crystallization of Active Pharmaceutical Ingredients (APIs) by Forwarding Osmosis and its Effect on Crystal Size and Morphology [†]

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Abstract: In the past decade, forward osmosis (FO) membrane technology has grown as an emerging technology in the desalination, wastewater treatment, pharmaceutical, and food processing industry. FO depends on the osmotic pressure difference between feed solution and feed draw solution, resulting in the separation of selective liquid components. FO is an energy-intensive process creating a concentration gradient between feed solution and draw solution, which is the driving force for separation and concentration of saturated solutions. The membrane-assisted crystallization (MAC) process, a combination of membrane technology with conventional crystallization processes, is a useful hybrid crystallization process recently developing mostly in the pharmaceutical and food processing sectors. This work aims to give a comprehensive study on the membrane-assisted FO process, which utilizes various operation conditions that are necessities for developing hybrid MAC for the active pharmaceutical ingredients (APIs). Membranes, with their intrinsic characteristics of high efficiency and operational simplicity, high selectivity and permeability, etc., represent a technology that well satisfies the concept of the various APIs production. This study aims to compare the effect of process parameters on crystal size and morphology of APIs by conventional crystallization and MAC.

Keywords: membrane-assisted crystallization; active pharmaceutical ingredient; forward osmosis; permeability; crystal morphology.

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Conflicts of Interest

The authors declare no conflict of interest.