



STUDY OF PERVAPORATION TECHNOLOGY FOR SEPARATION OF BIO-BASED MOLECULES

This study focuses on the application of pervaporation to separate bio-based molecules. Four bio-based molecules ranging from C3 to C6 will be considered: glycerol, succinic acid, furfural and HMF.

Objectives

The research project aims to develop an appropriate membrane based technology to develop an in-depth experimental study of the purification of products during the synthesis of bio-based molecules. The specific objectives are as follows:

- Evaluate experimentally the potential of pervaporation as stand-alone technology;
- Feasibility study on the technical viability of the membranes applications on target reactions;
- Integrate pervaporation in industrial existing processes: hybrid pervaporation – distillation (simulation of alternatives);
- Determine the economic feasibility of the overall process using pervaporation as stand-alone technology;

Overall research content

- Review of the state-of-the-art on the purification of the selected biomolecules. Different methods of liquid liquid separation technology: Liquid Liquid extraction, membrane technology in order to have an overview of the work;
- Experimental work: Evaluation of the membrane performance (technical viability) in a lab-scale pervaporation unit. Study the impact of temperature and concentration to the transmembrane flux and purity of the permeates;
- Membrane stability test in pervaporation: In the membrane stability tests, each membrane is mounted onto the membrane test cell to undergo an experiment for 24h.
- Modelling of mass transfer in the pervaporation unit;
- Simulation of alternatives hybrid pervaporation – distillation process via Aspen;

Qualification requirement

Students with background of environmental/chemical engineering with good laboratory skills.