MASS TRANSFER SIMULATION FOR CONCENTRATION OF KIWI JUICE BY OSMOTIC DISTILLATION USING FINITE VOLUME METHOD

Carlos E. Zambra, Universidad de Talca, Facultad de Ingeniería, Departamento de Ingeniería Mecánica, Chile
carlos.zambra.s@gmail.com

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Osmotic distillation (OD) is a membrane process used to separate water from fruit juices at ambient temperatures. The current mathematical models presented in literature for OD [1] are based on phenomenological equations and empirical correlations, which describe the global effects of the flow rate and concentration of the fluids in the transmembrane flux, and starting from this the total productivity and efficiency of the process. These models are unable of describe the local variations in the mass transfer which are product of geometric variables. If these variations were known this would allow improve predictions that can deliver information to build membrane modules whith optimal geometries which is very important for efficiency, scalability and durability of these modules. In this work, a general mathematical model adapted to one cylindrical hollow fiber was solved with the finite volume method. The numerical results allowed to reproduce the experimental data of transmembrane flux in OD using as flow feed a kiwi juice and calculate the variation in the concentration of water and other volatile compunds in the feed (juice) to the process. These studies may be used to predict and optimize the mass transfer in osmotica distillation process.

References

[1] Zambra, C., Romero, J., Pino, L., Saavedra, A., Sanchez, J. Concentration of cranberry juice by osmotic distillation process. Journal of Food Engineering 144 (2015) 58-65.