

Development of a continuous evaporation system for an API solution stream prior to crystallization

Phillip Roche¹, Roderick Jones¹, Brian Glennon², and Philip Donnellan¹

¹University College Dublin

²Affiliation not available

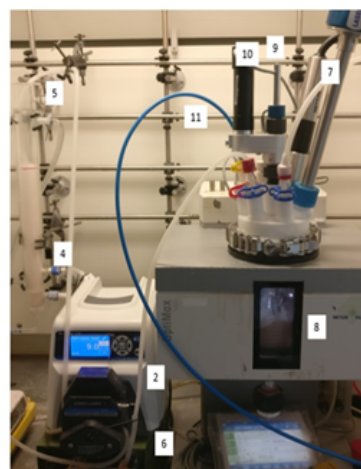
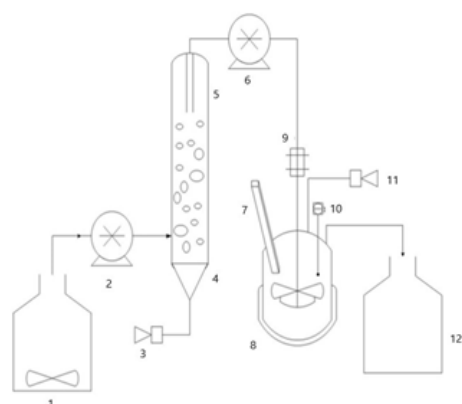
February 1, 2021

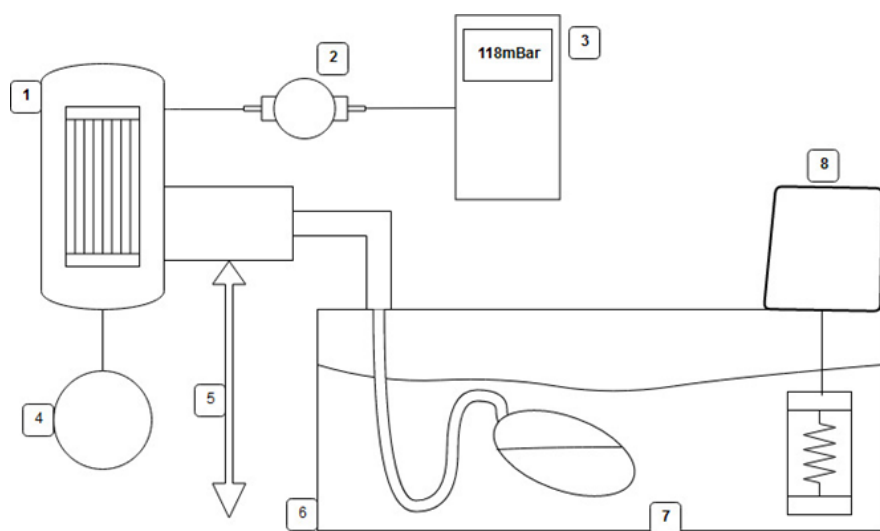
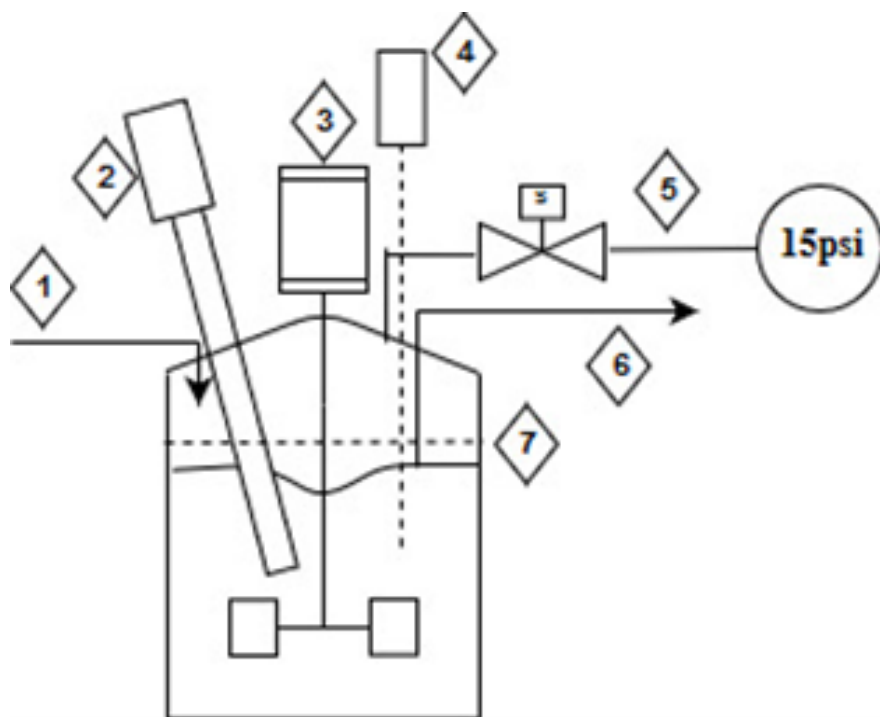
Abstract

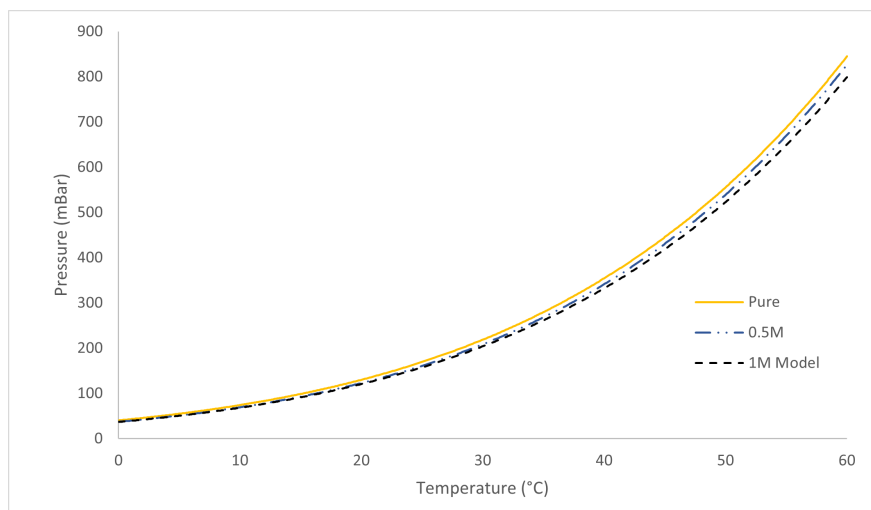
A bubble column was investigated as a method to achieve a desired and controllable rate of evaporation of a pharmaceutical solution in continuous processing mode. Applying a developed thermodynamic model to predict the rate of evaporation, all predicted values achieved accuracies within the bounds of instrumentation errors. The model accounted for the measured effect of reduced vapor pressure caused by dissolved solids as a function of their concentration. A general method to obtain accurate measurement of this effect is introduced and applied, improving the accuracy of model predictions. Predicting the rate of evaporation using the developed model, consistent and repeatable evaporation rates ranging from 0.7–6.9 g/min were achieved. Applying the column as a controllable evaporator, the concentration of a dilute feed stream was increased in a single equilibrium stage and coupled to a crystallizer. The configured system achieved a steady state of controllable operation over a duration of 5 hours

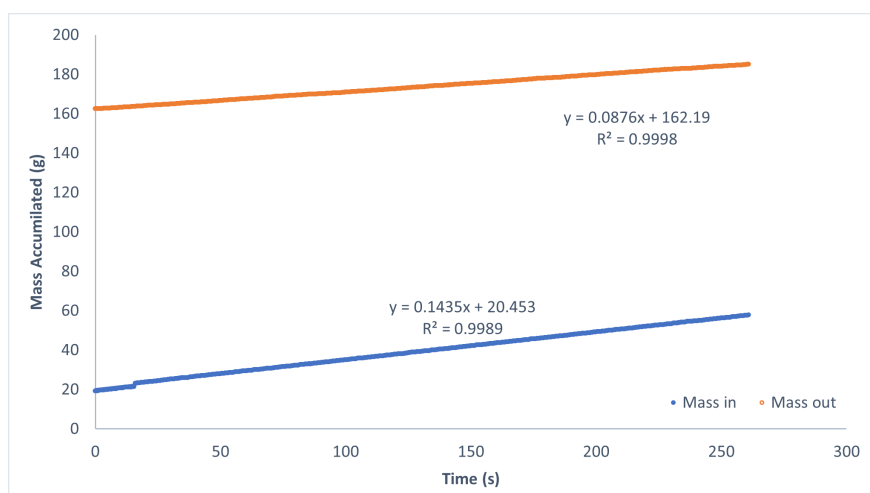
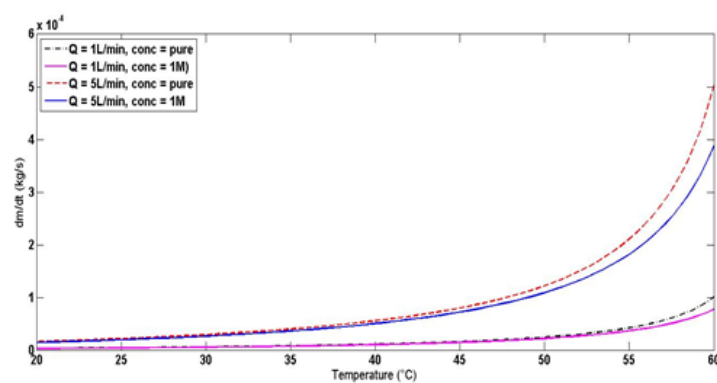
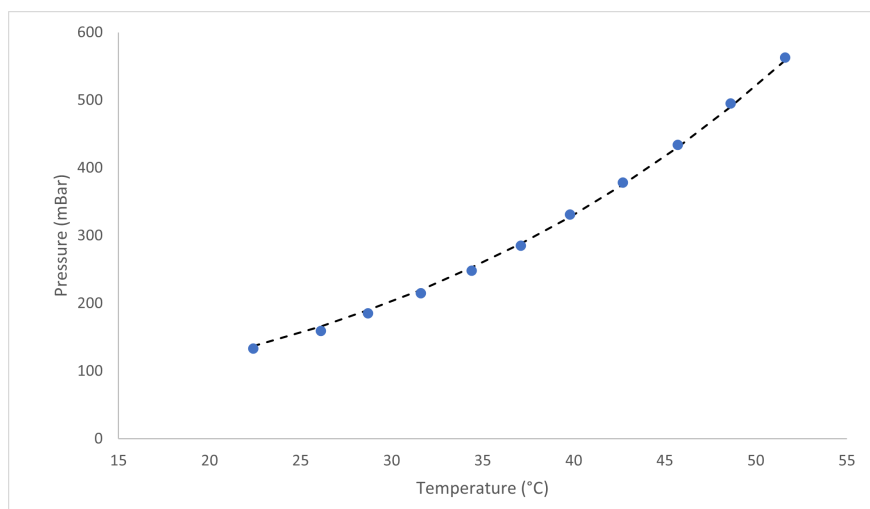
Hosted file

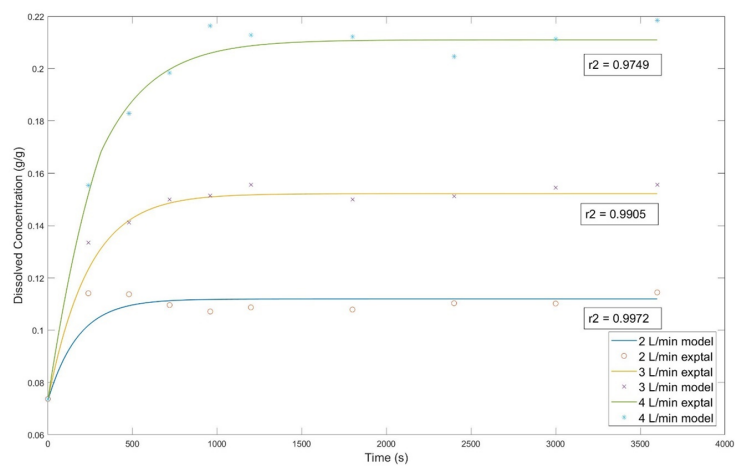
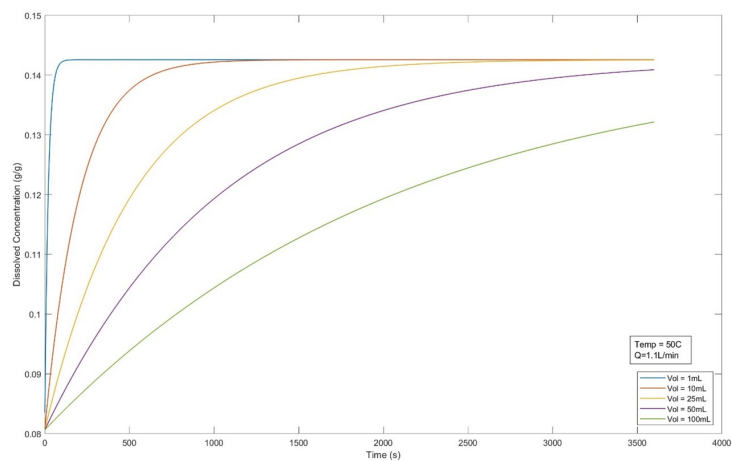
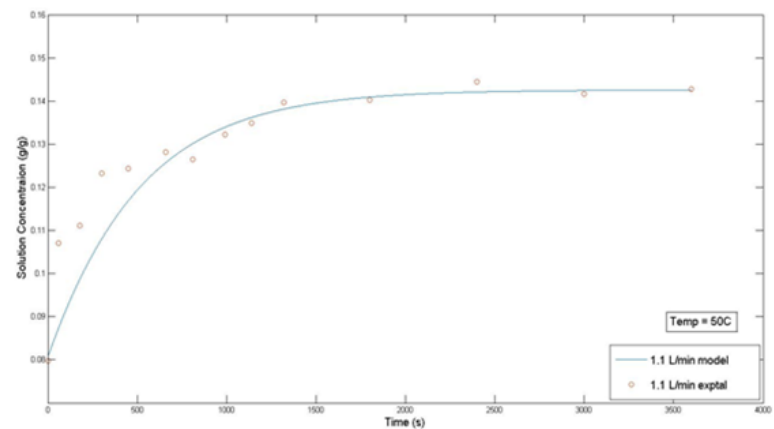
Manuscript - figs removed.pdf available at <https://authorea.com/users/393179/articles/506857-development-of-a-continuous-evaporation-system-for-an-api-solution-stream-prior-to-crystallization>

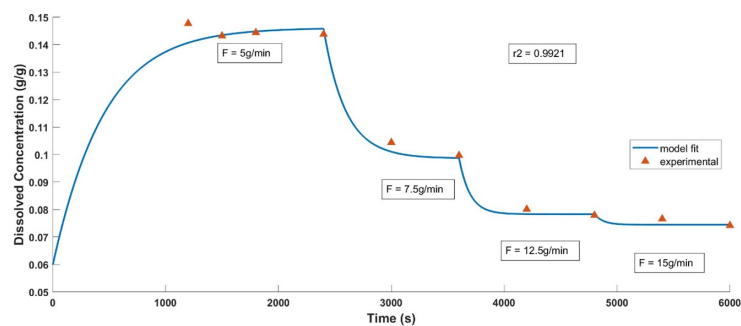
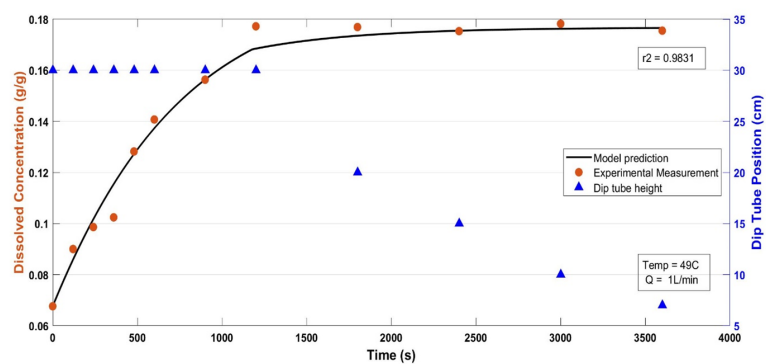
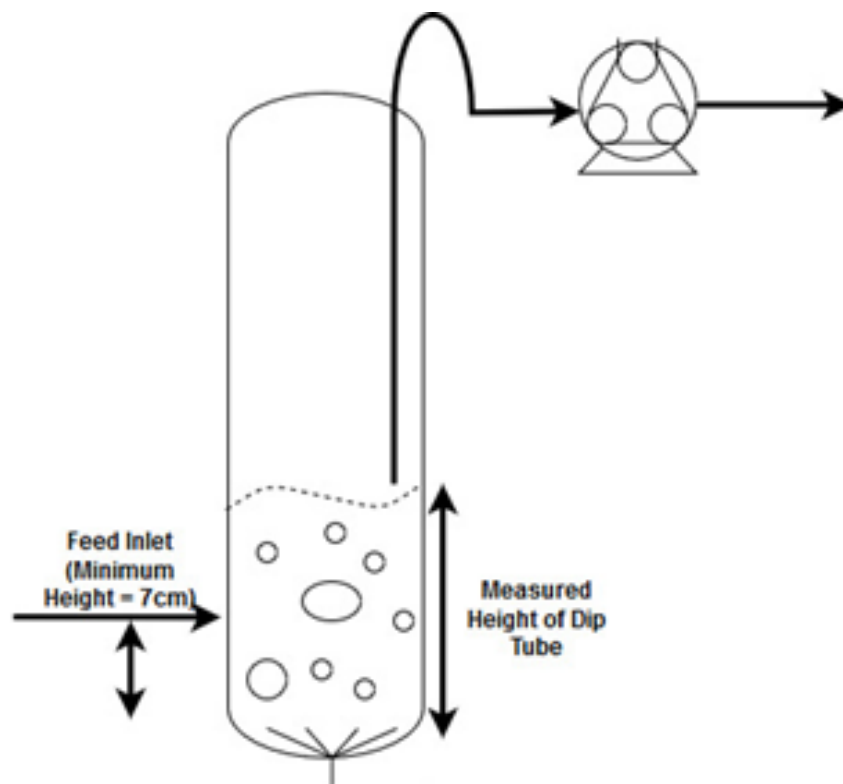


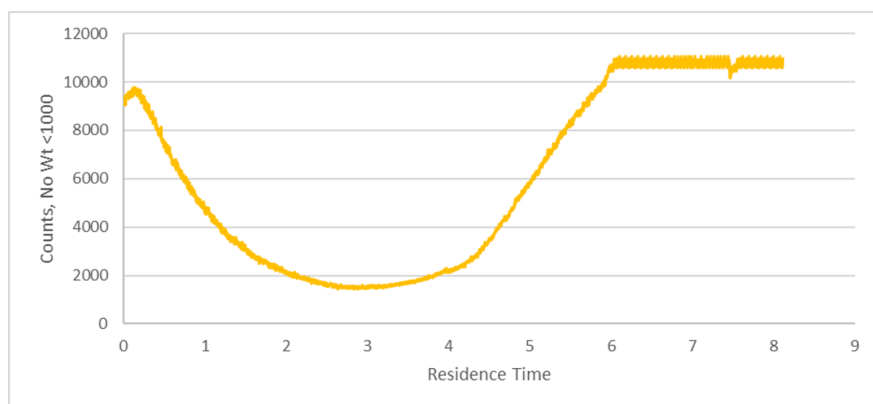
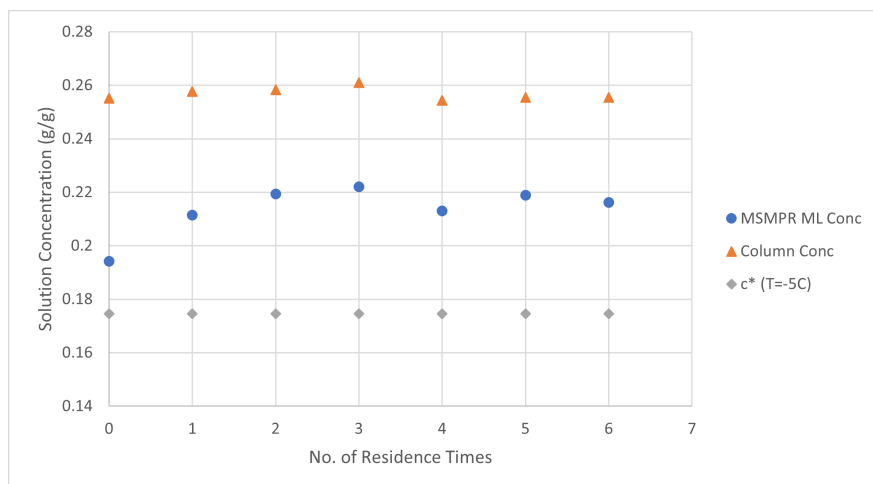












Hosted file

Tables.pdf available at <https://authorea.com/users/393179/articles/506857-development-of-a-continuous-evaporation-system-for-an-api-solution-stream-prior-to-crystallization>