MODELING AND OPTIMISATION OF THE DEXTROSE MONOHYDRATE CRISTALLISATION PROCESS

— research paper —

ION-DAN MIRONESCU[1], ANDREEA TOLEA, VIONELA MIRONESCU

Faculty of Agricultural Sciences, Food Industry and Environmental Protection, "Lucian Blaga" University of Sibiu, Romania

Abstract: The aim of the present work was to develop a simple mathematical model for the cooling crystallisation of α-dextrose monohydrate in vertical crystallisers and to use it for the optimisation of the plant operation. The system of differential algebraic equation representing the model was numerically simulated using the Scilab environment. Multiple simulation with different values for the cooling water temperature were performed in order to select the ones that assures the growth of the crystal beyond an technological imposed minimal size (500 μm). The results of the simulation with optimal values were presented. For a crystalliser with three individually temperature controlled cooling sections, the temperature of the cooling water at the inlet of the first section was found to be 25.5°C, whereas for the next two sections, the optimal cooling water temperature at the entrance was found to be 20.5°C.

Keywords: dextrose monohydrate, cooling crystallisation, model, optimisation

[1] Corresponding author: Ion-Dan Mironescu, "Lucian Blaga" University of Sibiu, Faculty of Agricultural Sciences, Food Industry and Environmental Protection (S.A.I.A.P.M.), Str. I. Ratiu 5-7, 550012, Sibiu, Romania. E-mail:imirod@yahoo.co.uk