Seeding optimization in the batch crystallization of CAM

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The citric acid monohydrate (CAM) is an important organic substance but, until 1997, the scientific literature covered mostly the kinetics of nucleation [3] and the crystal growth [4] rather than its production via the crystallization by cooling in a stirred tank reactor (STR). The Department of Chemical Engineering at the University "La Sapienza" of Rome decided to fill that sci-tech gap through a meticulous investigation, with three STRs at the laboratories of San Pietro in Vincoli's district (DICMA), on the crystallization in discontinuous (batch) of CAM from aqueous solutions. The author participated in that innovative experience, as experimenter and coder under the supervision of Prof. Barbara Mazzarotta, in the years 1997-1998 [1]. Our specific tasks were to spot the main operating conditions, to modify them until an *optimal* crystal size distribution (CSD), i.e., large-sized homogeneous crystals of CAM, and to write a QBasic program predicting the outcomes of any test in batch reactors [2]. Here we focus on the influence of the *seeding*, i.e., the role played by the CAM seed crystals in the process thanks to their varied sizes and dipping temperatures. All the data, collected and simulated, show that the *light* seed performs better than the heavy seed and that a *low* seeding temperature gives the best CSD. The homogenous distribution of large crystals from a low temperature round-bottomed tank, seeded with small CAM crystals, is due to the maximum efficacy of the driving force provided by the related supersaturation.

References

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