Investigating crystal growth in ambroxol hydrochloride solutions with the help of FBRM technique in case of non-typical spherical crystallization methods

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Abstract:

Spherical crystallization is usually the last technological step in the production of solid form drugs. Not only purification can be achieved with it, but we can manufacture the optimal morphology of the crystals. Spherical morphology with suitable mean particle size is advantageous when direct tablet making technique is used. This way the amount of the additives can be reduced and smaller tablets can be produced. In our previous research [1] it was found that the spherical crystallization of ambroxol hydrochloride can be achieved by the non-typical methods, such as spherical agglomeration and cooling crystallization. Because of the spherical morphology, flowing and compaction properties of the powder have improved. In the present work the parameter optimization was further investigated with the help of an FBRM probe, continuously observing the crystal growth in the non-typical crystallization systems. With this on line technique, it was possible to control the mean particle size and the optimal mixing time, and solvent-antisolvent ratio could also be determined. In case of the cooling crystallization, we applied an alternating temperature profile around the metastable zone in order to standardize the particle size. It was a heating-cooling cycle, so the smaller particles could dissolve when heating happened, then crystallize onto the surface of the larger crystals. With the FBRM probe, this process could be investigated and the exact, optimal length of the heating-cooling periods could be determined.

Image:

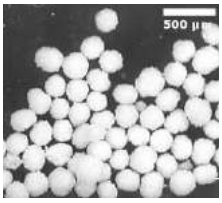


Figure 1. Spherical agglomerates of ambroxol hydrochloride prepared by the spherical agglomeration method.

Recent Publications:

1. Orsolya Gyulai, Zoltán Aigner, Piroska Szabó-Révész (2017) Comparison study of different spherical crystallization methods of ambroxol hydrochloride, Crystal Growth and Design (DOI: 10.1021/acs.cgd.7b00764)
2. Refining the parameters of spherical crystallization methods, Orsolya Gyulai, Piroska Szabó-Révész, Zoltán Aigner, 23rd International Workshop on Industrial Crystallization - BIWIC 2016, Magdeburg, 6-8 September 2016.
3. Spherical crystallization of ambroxol-hydrochloride Orsolya Gyulai, Piroska Szabó-Révész, Zoltán Aigner; 5th International School of Crystallization – ISC 2016 Granada, Spain, 29 May – 3 June, 2016.
4. Orsolya Gyulai, Zoltán Aigner, Optimization of the parameters of spherical agglomeration, FIP PSWC Stockholm, Sweden, 21-24 May, 2017
5. Orsolya Gyulai, Zoltán Aigner, Parameter optimization of the spherical agglomeration method, European Crystallography School - ECS 4 Warsaw, Poland, 2 -7 July, 2017



Biography:

Orsolya Gyulai earned her Masters' Degree at the University of Szeged as a Researcher Chemist in 2015 and now she is a third-year PhD student at the Institute of Pharmaceutical Technology and Regulatory Affairs. She is going to complete the PhD degree in 2018. She has won several scholarships and presented her research work in Spain, Germany, Sweden, Poland, the Czech Republic and also in Hungary. Her total impact factor is more than 4 at the age of 25. She has now 2 more publications under review. She would like to work for a pharmaceutical company, where she could benefit from what she has learned during the years.

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