



Secteur des Sciences
et Technologies

Invitation à la soutenance publique de thèse de

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Master bioingénieur : chimie et bio-industries à finalité spécialisée

Pour l'obtention du grade de Docteur en sciences agronomiques et
ingénierie biologique

« Development of a crystallisation process for calcium lactate
recovery from a fermentation broth »

qui se déroulera
le jeudi 05 mars 2020 à 16h30
Auditoire BARB 92
Place Sainte Barbe
1348 Louvain-la-Neuve

Jury members :

Prof. Tom Leyssens (UCLouvain), supervisor
Prof. Eric Gaigneaux (UCLouvain), chairperson
Prof. Patricia Luis Alconero (UCLouvain), secretary
Prof. Koen Robeyns (UCLouvain)
Prof. Frédéric Debaste (ULB, Belgium)
Prof. Emilie Gagnière (Université de Lyon 1, France)

Calcium L-lactate is an organic salt of economic importance in many fields such as food, cosmetic or pharmaceutical industry. This compound, generally recognized as safe, is used as a conservative, an excipient or a calcium supplement. Calcium lactate is usually produced by fermentation. Such process allows working in mild conditions and is economically interesting. However, at the end of the fermentation step, it is contaminated by impurities and diluted in water. In this context, crystallization is the method of choice for its extraction and purification. Previous attempts to crystallize calcium lactate in solution evidenced its high tendency to form fines difficult to filtrate afterwards.

In this work, we tried to develop a crystallization process for calcium lactate recovery under a pure solid form from its fermentation broth. The process was designed in the scope of a future industrial application, with the objective of being robust and easy to implement at a reduced cost. For that matter, we tried to raise a better understanding of calcium lactate thermodynamics. Up to now, the only solid forms characterized were a crystalline pentahydrate and an amorphous anhydrate. By combining various solid-state analysis techniques, we were able to characterize three new crystal forms and determine their relative stability. The pentahydrate was found to be the most interesting form for a crystallization in water. Different crystallization modes were then considered and revealed the importance to control seeding and solid/liquid ratio of the suspension. Several variables were influencing the process developed. Therefore, it was optimized through a full factorial design of experiment. At the end of this work, a crystallization process for calcium lactate was fully developed at lab-scale.