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About optimization and detection of unexploited metabolites in continuous culture

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Despite some more or less founded criticisms, the continuous cells culture progresses every day. This is true for both eukaryotes (mammals, insects etc.) and for prokaryotes (microorganisms). The phenomenon is perhaps especially true for the fermentation processes. The development of a biomass production (such as baker's yeast, for example) or of metabolites (such as lactic acid or other) requires a lot of efforts, including the choice of the process to be used (e.g. a simple chemostat, or a recycled one, or in cascade, etc.); most of the time, the points to optimize are yield and/or cost. Of course, the cultivation medium is also very important. Another very important part in the production techniques are the working conditions. Some can be very simple to solve, such as temperature, pressure etc. Others are sometimes very difficult, as the dilution rate of a chemostat (simple or not). Analysis of working conditions is the subject of this communication. We try to achieve two goals: to optimize some processes and behaviors using metabolomics methods and to demonstrate the ability to produce not yet exploited metabolites. The starting point is based on a small empirical model that was very efficient, called the Luedeking-Piret (L-P) model. The "model" was so productive that many scientists and engineers tried to apply it when clearly it was not directly adapted to their problem. The result is that dozens of ad hoc formulas derived from the L-P model have emerged, which lack any biological relevance. We updated the model to provide much more easily interpretable applications. In addition, we have used a complex model (the Crabtree effect), presenting switching metabolism, to identify conditions that are likely to produce unexploited metabolites

Biography

Jacques Thierie has completed his Ph.D. at the age of 55 years from the Université Libre de Bruxelles, after a DEA in sciences. After training as a chemist and researcher with the Nobel Prize Ilya Prigogine (non-linear thermodynamics), he turned to the life sciences and the environment. Fascinated by the sewage treatment plants (which are mostly large bioreactors), he extended his research to biotechnology and metabolic engineering. He has published more than 40 articles in international journals and participates in industrial creation.

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