



Conferência de Área 10: Systems biology for the development of microbi- al cell factories

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Industrial Biotechnology is increasingly replacing chemical processes in numerous industrial sectors since it allows the use of renewable raw-materials and provides a more sustainable manufacturing base. The field of Metabolic Engineering (ME) has thus gained a major importance since it allows the design of improved microorganisms for industrial applications. However, in Metabolic Engineering problems, it is often difficult to predict the effects of genetic modifications on the resulting microbial phenotype, owing to the complexity of metabolic networks. Consequently, the task of identifying the modifications that will lead to an improved microbial phenotype is a quite complex one, requiring robust mathematical and computational tools. In this presentation I will focus in some of our efforts in these fields, namely in the generation of better mathematical models of microbial metabolism and the development of reliable and effective computational and mathematical methods for the design of rational metabolic engineering strategies. Furthermore, I will introduce the open-source software tool developed in house, called OptFlux (www.OptFlux.org), that allows researchers both from industry and academia to simulate, in a user-friendly way, the behavior of industrially important microorganisms under a variety of conditions and also indicates which genetic modifications may lead to enhanced strains for a particular application.