PROCESS INTENSIFICATION FOR THE SUSTAINABLE IMPLEMENTATION OF INDUSTRIAL BOTECHNOLOGY

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Introduction. The succeful implementation of Industrial Biotechnology demands the development of processes that are both cost effective and a green alternative to existing ones.
Process intensification (PI) as a strategy that allows making dramatic reductions in plant volume in order to meet a certain production objective is expected to have an important impact in the development of Industrial Biotechnology. PI offers the possibility to develop and carry out chemical, pharmaceutical and biochemical reactions in a sustainable way and with higher selectivity.
In Industrial Biotechnology, PI can be achieved by different methods going from the development/improving of microbial strains used in the process to the use of novel bioreactors with enhanced productivity and innovative separation/purification processes.
The successful implementation of Industrial Biotechnology also demands the use of low cost and renewable biomass sources that raise important challenges on the treatment of the biomass for further biological transformation. Also in this particular situation, the application of the PI concept will be decisive for the Industrial use of biomass as a raw material for the production of chemicals.

Results. Results will be presented describing the development of yeast strains for its application in stressful environments as is the case of high sugar concentrations and the presence of inhibitors as those resulting from the pre-treatment of lignocellulosics for further biotransformation[1]. As said above, bioreactors with enhanced productivity are also required. This can be achieved by using micro-reactors and the switch from batch to continuous operation mode. Results on the use of a meso-OFR (Oscillatory Flow Reactor) in biotechnological processes will be presented and the main advantages of its application addressed[2]. The development of immobilized biomass bioreactors for the efficient conversion of different substrates to bioethanol will also be discussed[3].
Finally, considerations will be made on the challenges and PI strategies related with the valorization and reduction of biorefinery wastes in particular the transformation of C5 sugars and lignin into added value chemicals, creating a sustainable biorefinery concept[4].

References.

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