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Elucidating the potential of bio-processes on industrial waste streams

Worldwide bio-economy concepts foster the sustainable production and conversion of biomass into a range of food, health, fiber, industrial products, and energy. However, there is a risk that the diversion of farmland or crops for the production biofuels and bio-based products compromises the food supply - the food versus fuel dilemma. One way to circumvent this dilemma is the use of spent liquors from the pulping industry in terms of a wood biorefinery. The economic success of the utilization of these liquid fractions largely depends on an efficient separation and conversion of the organic compounds - predominantly the carbohydrates. Integrating biotechnological processes into existing pulp mills is expected to achieve those requirements. Employing extremophilic microorganisms in the bioprocesses could lead to further process intensifications by saving chemicals, cooling energy and sterilization steps.

Regarding a future integration of bioprocesses, better understanding and quantification are required. The improvement of those biological systems for biofuels production implies the study of different physiological key parameters in the developing bio-systems, using on-line signal monitoring and off-line analyses.

This contribution tries to elucidate the potential of bioprocesses utilizing spent sulfite liquor on the example of four very different processes employing an anaerobe thermophile, an anaerobe mesophile and an aerobe halophile for producing different base chemicals. Fortunately, the general methodology, finding the right strains, investigating inhibiting substances and pretreatment or investigation of physiological key parameters is the same for all the investigated cases.

Biography:

Christoph Herwig, bioprocess engineer from RWTH Aachen, worked in industry in the design and commissioning of large chemical facilities prior to enter his interdisciplinary PhD studies at EPFL, Switzerland in bioprocess identification. Subsequently he positioned himself at the interface between bioprocess development and facility design of biopharmaceutical facilities. Since 2008, he is full professor for biochemical engineering at the Vienna University of Technology. The research area focuses on the development of methods for integrated, science-based and efficient bioprocess development along PAT and QbD principles. The product fields are circular economy and biopharmaceuticals within industry driven projects.

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