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## **EXPLORATORY INVESTIGATION OF BIOPROCESSES SUSTAINABILITY IMPROVEMENT BY MULTICRITERIA- MULTILEVEL OPTIMIZATION**

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### **Abstract**

Up to the present days, the bioprocesses were designed and operated with the aim at achieving some economic, environmental, and social criteria. Sustainability based optimization has to be the next step towards the improvement of the economical, environmental and social parameters of bioprocesses. In this work, sustainability will be treated as an optimization task where the objective function(s) is/are either a performance index or a set of performance indices, subject to economic, environmental and social restrictions. The original multi-level optimization approach refers to two aspects: first, the hierarchic top-down procedure, from plant to process unit scales and second, a combined interaction of manpower and plant networks. The optimization process will be done using either an average objective function obtained by summation of the weighted objective functions, or a vector objective function, to identify the Pareto front in the space of feasible solutions.

*Key words:* bioprocesses, modeling, optimization, sustainability

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