

**Reviewer's Assessment of the dissertation of the doctoral student Ing. Mgr. Vojtech Belohlav
for his Ph.D Thesis:**

“Intensification of mixing and homogenisation of culture medium in photobioreactors for microalgae production.”

The present Doctoral Thesis contributes to the field of wastewater treatment and microalgae cultivation, providing the development of numerical models for HHT PBR and FP PBR microalgae production reactors and insights and meaningful conclusions about their overall hydrodynamic performance and optimization. The specific studies are sound and have been comprehensively and accurately performed.

The main objective of the present Doctoral Thesis, which is to study and optimize the operating conditions of two cultivation systems in order to intensify the microalgae production, has been achieved. The analysis has been performed through a combined approach comprising numerical modelling by means of Computational Fluid Dynamics (CFD), mechanistic modelling and experimentation. Partial hydrodynamic calibration and validation of numerical models have been achieved, leading to a better understanding and optimization of the studied microalgae production systems.

The state of the art is complete and accurately performed, including all significant topics concerning the doctoral dissertation.

The originality of the work is strongly supported by the publication of 6 papers in indexed journals, 4 of them as first author. Additionally, other two papers have been submitted to indexed journals and other two are in preparation.

The overall methodology carried out in this work is considered adequate and scientifically logic. First of all, the work is divided in two parts according to the two main microalgae production reactors studied (HHT PBR and FP PBR). Additionally, each part comprises a four-phase methodology: (i) experimental and/or functional analysis of the microalgae system, (ii) the development of the CFD numerical model, (iii) its calibration-validation against experimental data and (iv) a final analysis and optimization for different operational conditions.

The quality of the manuscript is adequate: Well-structured in various chapters, written in a scientific language and attending formal issues.

In resume, the Doctoral Thesis complies with all requirements to obtain the doctoral degree by Universitat Politècnica de Catalunya and Czech Technical University in Prague.

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