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Jack LEGRAND is Professor in Chemical Engineering at the University of Nantes since 1988. He is specialist in transport phenomena and mixing in processes and (photo) bioreactors. He has ca 200 publications in international journals and books and is co-author of 10 patents. He is head of the Joined Research Unit (UMR) GEPEA (Process Engineering for Environment and Food) between CNRS, University of Nantes, ENITIAA and School of Mines of Nantes. He is member of the national committee of the CNRS in the Engineering Science section.

Research Fields

Study of the fundamental problems dealing with transfer phenomena in mass/heat exchangers (reactors, mixers), by developing a specific metrology based on electrochemical methods. The modelling of mass exchangers is approached from the knowledge of the flow structure of flow and by using the methodology of the Chemical Engineering. Studies are related to mixing and bioreactors, particularly the emulsion processing, microencapsulation processes, the centrifugal partition chromatography and the conception and modelling of photobioreactors applied to the valorisation (biomass, energy, metabolites of interest) of microalgae.

Publications 2008 & 2009 in the bioprocess field

M. MOJAAT, A. FOUCAULT, J. PRUVOST, J. LEGRAND

“Optimal selection of organic solvents for biocompatible extraction of β -carotene from *Dunaliella salina* ». **Journal of Biotechnology**, 133, 433-441 (2008).

M. MOJAAT, A. FOUCAULT, J. PRUVOST, J. LEGRAND

“Effect of organic carbon sources and Fe^{2+} ions on growth and β -carotene accumulation by *Dunaliella salina*». **Biochemical Engineering Journal**, 39, 177-184 (2008).

J. PRUVOST, J.-F. CORNET, J. LEGRAND

“Hydrodynamics influence on light conversion in photobioreactors: An energetically consistent analysis”. **Chemical Engineering Science**, 63, 3679-3694 (2008).

S. FOUCHARD, J. PRUVOST, B. DEGRENNE, J. LEGRAND

“Investigation of H_2 production using the green microalga *Chlamydomonas reinhardtii* in a fully-controlled photobioreactor fitted with on-line gas analysis”. **International Journal of Hydrogen Energy**, 33, 3302-3310 (2008).

P. VAUCHEL, A. ARHALIASS, J. LD, R. KAAS, R. BARON

- “Decrease of dynamic viscosity and average molecular weight of alginate from *Laminaria digitata* during alkaline extraction”. **Journal of Phycology**, 44, 515-517 (2008).
- P. VAUCHEL, K. LEROUX, R. KAAS, A. ARHALIASS, R. BARON, J. LEGRAND
« Kinetics modeling of alginate alkaline extraction from *Laminaria digitata* ». **Bioresource Technology**, 100, 1291-1296 (2009).
- S. FOUCHARD, J. PRUVOST, B. DEGRENNE, M. TITICA, J. LEGRAND
“Kinetic modeling of light limitation and sulphur deprivation effects in the induction of hydrogen production with *Chlamydomonas reinhardtii*. Part I: Model development and parameters identification”. **Biotechnology and Bioengineering**, 102, 232-245 (2009).
- K. LOUBIERE, E. OLIVO, G. BOUGARAN, J. PRUVOST, R. ROBERT, J. LEGRAND
« A new photobioreactor for continuous microalgal production in hatcheries based on external-loop airlift and swirling flow”. **Biotechnology and Bioengineering**, 102, 132-147 (2009).
- R. RIHANI, J. LEGRAND, A. BENSMAILI
“Mixing in milli torus reactor under aerated conditions”. **Chemical Engineering and Processing: Process Intensification**, 48, 1012-1019 (2009).
- W. BLEL, D. PIERRAT, C. LE GENTIL, P. LEGENTILHOMME, J. LEGRAND, C. HERMON, C. FAILLE, T. BENEZECH
“Numerical and experimental investigations of the flow structures through a gradual expansion pipe”. **Trends in Food Science & Technology**, 20, S70-S76 (2009).
- M. AFFI, C. SOLLIEC, P. LEGENTILLOMME, J. COMITI, J. LEGRAND, G. THOUAND
“Numerical design of a card and related physicochemical phenomena occurring inside agarose-immobilized bacteria: a valuable tool for increasing our knowledge of biosensors”. **Sensors & Actuators: B. Chemical**, 138, 310-317 (2009).
- R. RIHANI, J. LEGRAND, A. BENSMAILI
“Fuzzy logic modelling tracer response in milli torus reactor under aerated and non-aerated conditions”. **Chemical Engineering Journal**, 152, 566-574 (2009).
- J. PRUVOST, G. VAN VOOREN, G. COGNE, J. LEGRAND
« Investigation of biomass and lipids production with *Neochloris oleoabundans* in photobioreactor”. **Bioresource Technology**, 100, 5988-5995 (2009).
- M. YATAGHENE, F. FAYOLLE, J. LEGRAND
"Experimental and numerical analysis of heat transfer including viscous dissipation in a scraped surface heat exchanger". **Chemical Engineering and Processing: Process Intensification**, 48, 1439-1488 (2009).
- T. DE PILLI, J. LEGRAND, R. GIULIANI, A. DEROSI, C. SEVERINI
“Effects of Processing Variables and Enzymatic Activity on Dough Wheat Flour-Based Extruded Under Different Operating Conditions”. **Food Technology and Biotechnology**, 47 (4), 404-412 (2009).