## International Conference on

## **Bioreactor Fluid Dynamics**

Cambridge, England: 15-17 April, 1986

## **CONTENTS**

Paper		<b>Pag</b> e
1	IMMOBILIZED SYSTEMS Oxygen mass transfer and particle circulation in an immobilised cell bioreactor J.F.Dean and C. Webb, U.M.I.S.T., U.K.	1
2	Fluid dynamics and mass transfer in a three-phase circulating bed fermenter V.Y. Loh, S.R. Richards and P. Richmond, AFRC Food Research Institute, Norwich, U.K.	17
3	BUBBLE COLUMNS Simple measurement techniques for the determination of bubble- and bulk-phase velocities in bioreactors A. Lubbert, T. Korte, and B. Larson, University of Hannover, F.R. Germany.	33
4	The effects of phase properties on bubble behaviour gas hold-up and mixing in bubble columns.  E.L. Smith, M. Jamialahmadi, J.T. Olajuyigbe, and J. Shayegan Salek, University of Aston, Birmingham, U.K.	45
5	A comparison of different heat exchanger-installations in bubble columns with respect to their heat transfer behaviour.  H.J. Korte, A. Steiff and P.M. Weinspach, University of Dortmund, F.R. Germany.	61
6	BUBBLE COLUMN LOOP REACTORS Fluid dynamic behaviour of airlift tower loop reactors K. Schugerl, J. Burschapers, M. v. Frieling, A. Gebauer, T. Lorenz, A. Lubbert and T. Scheper, University of Hannover and K. Czech and S. Frohlick, Gesellschaft fuer Biotechnologische Forschung mbH, Braunschweig, F.R. Germany.	73
7	Hydrodynamics and axial dispersion in an airlift-loop bioreactor with two and three-phase flow P. Verlaan, J. Tramper and K. van 't Riet, Agricultural University, Wageningen and K.Ch.A.M. Luyben, University of Technology, Delft, The Netherlands.	93
8	Bubble break-up in turbulent liquid A.B. Pandit and J.F. Davidson, University of Cambridge, U.K.	109
9	On the mixing behaviour of gas-liquid jet loop reactors H.J. Warnecke, Universitat-Gesamthochschule Paderborn, F.R. Germany.	121
10	Hydraulic behaviour of a pump deep shaft reactor M. Tuchs and W. Zielke, Institute of Fluid Mechanics, University of Hannover, F.R. Germany.	137
11	SHEAR SENSITIVE SYSTEMS Applications of the airlift fermenter L.A. Wood and P.W. Thompson, Celltech Ltd., U.K.	157
12	Shear deactivation of enzymes in membrane reactors  E. Flaschel, E. Raetz and A. Renken, Swiss Federal Institute of Technology, Switzerland	173

13	FLUIDIZED BED SYSTEMS Use of inverse fluidisation in biofilm reactors C. Chavarie, Ecole Polytechnique de Montreal, Canada and D. Karamanev, Bulgarian Academy of Sciences, Bulgaria.	181
14	Twin-type fluidised bed bioreactor for nitrate removal V. Major and E. Fleit, Research Centre for Water Resources Development, Hungary.	191
15	RECENT DEVELOPMENTS Hydrodynamic studies on a high turbulence plunging jet contactor for aerobic fermentations. J. Ingham and A.B.J. Sofolarin, University of Bradford, G.E. Guidoboni, John Brown Eng. and Constructors Ltd., I. Kenyeres, Technical University of Budapest, Hungary.	201
16	MIXING AND CONCENTRATION FIELD ANALYSIS  A microbial culture for the measurement of macro and micro mixing phenomena in biological reactors  M. Griot, J. Moes, E. Heinzle, I.J. Dunn, and J.R. Bourne, ETH, Switzerland.	203
17	Regime analysis of the baker's yeast production A.P.J. Sweere, J.R. Mesters, K.Ch.A.M. Luyben and N.W.F. Kossen, Delft University of Technology, The Netherlands.	217
18	On-line determination of mixing parameters in fermentors using pH transients. V. Singh, W. Hensler and R. Fuchs, Schering-Plough Corporation, and A. Constantinides, Rutgers University, U.S.A.	231
19	Simulation of a methylotroph's behaviour in an imperfectly mixed fermenter J.A.E. Roberts and N.K.H. Slater, University of Cambridge, U.K.	257
20	STIRRED FERMENTERS  Mass transfer in a multiturbine fermentor. 1 gassed and ungassed power inputs.  F.G. Bader, Bristol-Myers Co, U.S.A.	269
21	The use of hydrofoil impellers to improve oxygen transfer efficiency in viscous mycelial fermentations.  B.C. Buckland and K. Gbewonyo, Merck Sharp and Dohme Laboratories and D. DiMasi, University of Virginia, U.S.A.	281
22	Mass Transfer and hold-up in an agitated simulated fermentation broth as a function of viscosity A.D. Hickman, National Engineering Laboratory, Scotland and A.W. Nienow, University of Birmingham, U.K.	301
23	Coalescence in three phase systems J.J. Frijlink and J.M. Smith, Laboratory for Physical Technology, The Netherlands.	317
24	ASSORTED Trichosporon cutaneum as a biological test system with two forms of morphology. A. Moser and W. Kung, Technical University of Graz, Austria	329