



BIOIBEROAMÉRICA
BIOTECNOLOGÍA INTEGRANDO CONTINENTES

INCORPORA:

BIOTEC 2016

LIBRO DE RESÚMENES

BOOK OF ABSTRACTS

LIVRO DE RESUMOS

SALAMANCA
Del 5 al 8 de junio de 2016



REGISTRO ISBN

Nº de Registro 2016035995

Fecha entrada 12/05/2016

ISBN 978-84-608-8233-8

Título	LIBRO DE RESÚMENES - BIOIBEROAMERICA 2016		
Subtítulo	Libro de resúmenes correspondientes al Congreso Iberoamericano de Biotecnología 2016		
Autorías	CONGRESO IBEROAMERICANO DE BIOTECNOLOGIA(1)2016(SALAMANCA (Congreso) Gonzalez Garcinuño, Alvaro (Editado por)		
Editorial o Autor/Editor	Congresual S.L. Camelias, 470, Galindo y Perahuy, 37449, Salamanca		
Formato	Digital: online Necesita conexión a Internet		
Edición	Nº y mención de edición	Fecha de aparición	ISBN edición anterior
	1	08/06/2016	
Colección			
Idioma	De la publicación	Traducido del	Original
	Español / Castellano y otros		
Descripción	Nº de páginas	Ilustraciones	Tamaño
	548		
Materias IBIC	TC, INGENIERÍA BIOQUÍMICA - TQ, CIENCIA, INGENIERÍA Y TECNOLOGÍA MEDIOAMBIENTALES - TV, AGRICULTURA Y EXPLOTACIÓN AGROPECUARIA - TT, OTRAS TECNOLOGÍAS Y CIENCIAS APLICADAS		
Material anejo			
Obra en varios volúmenes	Nº de volúmenes	O si es un volumen	ISBN de la obra completa
			Nº de este volumen
Libro de texto			
Notas	Libro con los resúmenes de las comunicaciones del Primer Congreso Iberoamericano de Biotecnología BIOIBEROAMERICA 2016		

Agencia del ISBN en España

☎ 902 105 389 - agencia@agenciaisbn.es - www.agenciaisbn.es - Cea Bermúdez 44, 28003 Madrid

Format:
Póster: P_IB_05

Symposium:
BIOCHEMICAL ENGINEERING, BIOCATALYSIS, BIOREACTORS, DOWNSTREAM, BIOSENSORS AND
PROCESS INTEGRATION

Title:
Application of a constricted mesotube reactor with oscillatory flow to acetic fermentation

Authors:
Coelho E, Teixeira J, Domingues L
Institution - Company:
University of Minho
E-mail:
e.coelho@ceb.uminho.pt

Keywords:
Oscillatory flow; Acetic fermentation; Constricted mesotube

Abstract:

Acetic acid bacteria are strict aerobes, capable of oxidizing ethanol to acetic acid in the presence of oxygen. Considering that acetification is an exothermal process, with high need for oxygen supply, efficient mass transfer between the gaseous and aqueous phase and efficient heat transfer in the fermentation medium, pose as the main challenges when focusing process improvement. Throughout time, several setups have been tested and used for improving efficiency in acetic fermentations, ranging from open barrel to automated acetator setups with air injection. This work demonstrates the use of a constricted oscillatory mesotube reactor for acetic fermentations, as an alternative to common acetification setups. The constricted mesotube reactor combined with oscillatory flow leads to high mass and heat transfer within the fermentation chamber, due to the combination between axial mixing of the fermentation media, promoted by pistons, and the periodic constrictions, which function as baffles. Hydrodynamic properties of this type of setup have already been described, demonstrating an improved gas diffusion in liquid media. Furthermore, this type of reactor has been tested for several chemical and biological processes, and demonstrated high potential in process improvement. In this work, acetic fermentations were performed in an oscillatory constricted mesotube reactor, using an *Acetobacter* sp. inoculum in a synthetic medium containing acetic acid and ethanol. Acetifications were carried out at 30°C with air injection at 0.18 vvm. Biomass growth, total acidity and ethanol-acetic acid conversion were monitored during the process, being observed that stationary phase was reached at about 70 hours, for an increase in biomass concentration of about 0.2 ± 0.1 g L⁻¹ (expressed in dry weight) and a final total acidity of $4.2 \pm 0.6\%$, with an ethanol-acetic acid conversion efficiency of $97.4 \pm 9.28\%$ of the theoretical yield and a GK efficiency of $96.7 \pm 16.7\%$. These results indicate that oscillatory flow in a constricted mesotube reactor has high potential for the application to the acetification process, due to the high yields and efficiency, attaining performance values similar to the ones reported for other common acetification setups, with a smaller air supply.