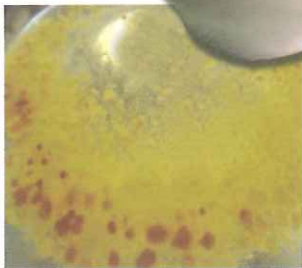


EXPERIMENTAL METHODS in MODERN BIOTECHNOLOGY

Volume 2



Editors

Parveen Jamal

Ibrahim Ali Noorbatcha

Azlin Suhaida Azmi



EXPERIMENTAL METHODS in MODERN BIOTECHNOLOGY

In order to fulfil the ever-growing biotechnology products in the form of, e.g. bioactive compounds for various pharmaceutical applications, promising microorganism for production of value added products and turning wastes into wealth, scientists have to resort to newer and sophisticated technology so that they could accomplish their targets without taking too copious times. Towards this end, various research methods have come into being. There are a number of books and research papers guiding and facilitating biotechnology students at all levels. In view of the facts that some writings have become obsolete and some others are very difficult for students to understand, the teaching staff of the Department of Biotechnology Engineering of the Faculty of Engineering, International Islamic University Malaysia, Malaysia took initiative to write an edited book on experimental methods in biotechnology in two volumes covering fairly all sorts of experiments that can possibly be resorted to. The book entitled 'Experimental Methods in Modern Biotechnology,' Vol. 1, which is already in the market, has proved to be very useful to students and scientists and technocrats working in biotechnology industries. But since the book does not cover all experimental methods volume 2 is proposed to cover the following remaining areas: Cell attachment and viability assay for anticancer properties; preparation of solid and liquid media for plant culture; initiation of plant cell suspension cultures from seeds; Application of various chromatographic techniques for extraction, isolation and purification of enzyme inhibitors for diabetic control as well as determination and quantification of ethanol and byproducts. It also covers various methods for the hyaluronidase inhibitory activity bioassay and bromelain enzyme Assay. Furthermore, it encompasses the aspects of isolation and characterization of thermophilic bacterial isolates producing L-asparaginase, bacterial preservation for short and long-term storage and estimation of fungal biomass in bioprocess engineering experiments and extraction of oil from waste source. The proposed 2nd volume of the book will complete almost all areas of experimental biotechnology. The complete book will certainly be useful to students pursuing degrees and research in biotechnology and to scientists and technocrats working in biotech industries locally and overseas.



Prof. Dr. Parveen Jamal obtained her B.Sc, B.Ed, M.S c, M.Phil and Ph. D from Aligarh Muslim University, India. Her areas of interest are: Medicinal chemistry, natural products processing, secondary metabolites and their applications, microbial fermentation technology and downstream processing for biotechnological products, bioconversion of natural products and organic residues to value added products i.e. bioprotein, organic acids, biosurfactant, feed, bioactive compounds etc. She has extensively contributed on different aspects of these areas by teaching, guiding research and publishing. Prof. Parveen has quite long teaching experience. She had been holding teaching positions in Banaras Hindu University, India and International Islamic University Malaysia. She is presently working as Professor and Coordinator (Bioprocess and Molecular Engineering Research Unit) in the Department of Biotechnology Engineering, Faculty of Engineering of International Islamic University Malaysia, Malaysia.

ISBN 978-967-416-364-4



IUM Press

Email: iiumbookshop@iium.edu.my

Website: <http://www.iium.edu.my/research>

<http://iiumpress.iium.edu.my/bookshop>



First Edition, 2016
©IIUM Press, IIUM

IIUM Press is a member of the Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

All rights reserved. No part of this publication may be reproduced,
stored in a retrieval system, or transmitted, in any form or by any means,
electronic, mechanical, photocopying, recording, or otherwise,
without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Parveen Jamal

Experimental Methods in Modern Biotechnology.

Volume 2 / Prof. Dr. Parveen Jamal.

ISBN 978-967-418-384-4

I. Biotechnology. I. Title.

660.6

Published by:

IIUM Press

International Islamic University Malaysia

P.O. Box 10, 50728 Kuala Lumpur, Malaysia

Tel: +603-6196 5014; Fax: +603-6196 4862/6298

Printed in Malaysia by:

REKA CETAK SDN. BHD.

12 & 14, Jalan Jemuju Empat 16/13D

Seksyen 16

40200 Shah Alam, Selangor, Malaysia

Contents

<i>Preface</i>	ix
Chapter 1: Simple Cell Attachment and Viability Assay for Screening Anticancer Properties of Natural Products <i>Yumi Zuhanis Has-Yun Hashim</i> <i>Chris Gill</i>	1
Chapter 2: A Simple and Easy Method for Preparing Solid and Liquid Media for Plant Culture <i>Noor Illi Mohamad Puad</i> <i>Tang Chi Wai</i>	9
Chapter 3: Initiation of Plant Cell Suspension Cultures from Seeds <i>Noor Illi Mohamad Puad</i> <i>Ferda Mavituna</i>	16
Chapter 4: Extraction and Isolation of Xanthine Oxidase Inhibitors from Carica Papaya Leave Extract using Chromatographic Techniques <i>Parveen Jamal</i> <i>Saiful Mohammad Nizam Azmi</i> <i>Azura Amid</i>	25
Chapter 5: Application of HPTLC and HPLC for Purification of Bioactive Compounds from Plant Extract for Gout Remedy <i>Parveen Jamal</i> <i>Saiful Mohammad Nizam Azmi</i> <i>Azura Amid</i>	36
Chapter 6: Determination and Quantification of Ethanol and Byproducts using HPLC (Brand: WATERS) <i>Azlin Suhaida Azmi</i>	47

Chapter 7: Enzymology Method to Determine the Anti-Inflammatory Potentials: Hyaluronidase Inhibitory Activity Bioassay <i>Nor Hayati Abdullah</i> <i>Ibrahim Ali Noorbatcha</i>	53
Chapter 8: Bromelain Enzyme Assay using Casein as Substrate <i>Azura Amid</i> <i>Mohd Jamil Aizat Jamaluddin</i>	62
Chapter 9: Isolation and Characterisation of Thermophilic Bacterial Isolates Producing L-asparaginase <i>Dzun Noraini Jimat</i> <i>Intan Baizura Firda Mohammed</i>	72
Chapter 10: Estimation of Fungal Biomass in Bioprocess Engineering Experiments <i>Mohamed Ismail Abdul Karim</i>	81
Chapter 11: Extraction of Oil from Waste Source <i>Sarina Sulaiman</i>	94
Chapter 12: Bacterial Preservation for Short and Long-Term Storage <i>Raha Ahmad Raus</i>	102
<i>Index</i>	111



Dr. Ibrahim Ali Noorbatcha's academic pursuit revolves around integrating computational and experimental techniques to design and develop new molecules. He is currently working on designing novel biomolecules and nanoparticles

with enhanced functional properties. His research work has predicted a novel phytase with enhanced thermostability and enzyme activity, which has been confirmed experimentally. This approach is being currently extended in our labs to develop novel cellulases for industrial applications. His research group has come up with the green technology approach for the production metal and metal oxide nanoparticles using microbes and plants. Their work on producing gelatine nanoparticles from fish skin is being extended to produce gelatine nanoparticles from other sources and use them for encapsulation studies. His other significant scientific contributions include understanding the effects of lasers in homogeneous and heterogeneous chemical reactions, surface diffusion, reactions involving van der Waals molecules, and six-centred reactions. His highly rated work on the Monte-Carlo simulations of laser induced desorption from surfaces has been cited more than 100 times in ISI journals. He has edited two books and contributed 12 chapters in various monographs. He has served as a reviewer for Elsevier, Springer, Wiley-Blackwell and IEEE journals. He has won several medals, awards and patents at the national and international levels. The most significant of them is the young scientist award (TWAS and MAAS) and best teacher award (IIUM). He has held several positions such as Deputy Dean, PG Coordinator, Academic Advisor, Researcher and Academician in India, USA, South Korea and Malaysia. Currently he is attached to Faculty of Engineering, International Islamic University Malaysia.



Dr Azlin Suhaida Azmi is currently an assistant professor of biotechnology engineering at International Islamic University Malaysia. Previously she taught at Universiti Teknologi PETRONAS. She received her BSc in Chemical Engineering

from Widener University, USA. Her MSc was in Process Integration from University of Manchester Institute of Science and Technology (UMIST), UK. Her PhD was in Bioprocess in Chemical Engineering from University Malaya, Malaysia.