CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME II

Editors:

Ibrahim Ali Noorbatcha
Hamzah Mohd. Salleh
Mohamed Elwathig Saeed Mirghani
Raha Ahmad Raus

IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

(*VOLUME II*)

Editors:
Ibrahim Ali Noorbatcha
Hamzah Mohd. Salleh
Mohamed Elwathig Saeed Mirghani
Raha Ahmad Raus

Department of Biotechnology Engineering
Faculty of Engineering
International Islamic University Malaysia

IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Ibrahim Ali Noorbatcha, Hamzah Mohd. Salleh, Mohamed Elwathig Saeed Mirghani & Raha Ahmad Raus: Current Research and Development in Biotechnology engineering at IIUM Volume II

ISBN: 978-967-418-151-2

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN. BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan

CONTENTS

CHAPTER 45

SOLUBILIZATION OF VITAMIN E IN CULTURE MEDIUM AND ITS ANTIOXIDANT ACTIVITY

Irwandi Jaswir and Siti Fairus Sahul Hamid

Department of Biotechnology Engineering, Faculty of Engineering,
International Islamic University Malaysia, P.O. Box 10, 50728 Kuala Lumpur, Malaysia

ABSTRACT

In this project, was developed a solubilization method of vitamin E in DMEM (Dulbecco modified Eagle's minimal essential medium) culture medium in order to attain higher concentration absorbance of vitamin E. There are two method which are conventional and evaporation methods. Vitamin E plays an important role in prevention of chronic disease. Furthermore, we will compare and contrast conventional and evaporation method for solubilization of vitamin E in culture medium. Cellular uptake, antioxidative as well as possible prooxidant activities of vitamin E in DMEM medium was determined under a wide range of their concentration. The aspect that concerned in this project is the optimum process condition to yield the highest concentrations of vitamin E. The process conditions in this project are the concentration of Tetrahydrofuran (THF) and concentration of vitamin E where the function of THF is to enhance the solubilization. The Design Expert software with Central Composite Design was used in this project for the optimization purpose and analyzes the antioxidant activity. Evaporation performed the best method compare to the conventional method due to the higher antioxidant activity. The percentage is 97.5% when use 60μM and 6% of THF.

Keywords: Vitamin E, solubilization, DMEM, cellular uptake.

INTRODUCTION

Dietary antioxidants are substances in foods that significantly decrease the adverse effects of reactive oxygen species, reactive nitrogen species, or both on normal physiological function in humans. Mostly found in fruits and vegetables, they, prevent free radicals from attacking cells and damaging DNA. Epidemiological evidences have suggested that intake of fruits and vegetables reduce the risk of both cancer and cardiovascular disease. (Dutta *et al.*, 2003). Flavonoids, carotenoids, vitamin C, vitamin E and selenium are the major dietary antioxidant.

Vitamin E's function as an antioxidant is dependent upon its ability to break radical-propagated chain reactions. As a result, the formation of the tocopheroxyl radical, the odd-electron derivative of vitamin E, is an inherent part of any vitamin E based, antioxidative