

*AGROBACTERIUM-MEDIATION TRANSFORMATION OF  
RICE WITH OMEGA-3-DESATURASE GENE.*

MUHAMMAD HAZIQ SYAHR BIN KHAIZURAN

FAKULTI SAINS DAN TEKNOLOGI  
UNIVERSITI MALAYSIA TERENGGANU  
2013



*AGROBACTERIUM-MEDIATION TRANSFORMATION OF RICE WITH OMEGA-3-  
DESATURASE GENE.*

By  
MUHAMMAD HAZIQ SYAHIR BIN KHAIZURAN

A research report submitted in partial fulfillment of the  
requirement for the award of the degree of  
Bachelor of Science (Biological Sciences)

FACULTY OF SCIENCE AND TECHNOLOGY  
UNIVERSITY MALAYSIA TERENGGANU

2013

## ACKNOWLEDGEMENT

With the name of Allah,  
The Most Gracious, The Most Merciful.

I would like to give credit to my supervisor, Assoc. Prof. Dr Aziz Ahmad for his painstaking, advice and guidance to accomplish my final year project. I also appreciate my co-supervisor, Assoc. Prof. Dr Cha Thye San for his kindness in providing materials. My deepest gratitude goes to post graduate students especially Miss Ashikin Mohd Nor and Mr Zairul Fazwan Zainordin. Thanks also to all laboratory assistant for their cooperation. Special thanks dedicated to my parents, Khaizuran Mat Daud and Norima Mohd Sauli for their motivation and support. Last but not least, it is my pleasure to thanks all my family and friends.



**PENGAKUAN DAN PENGESAHAN LAPORAN BIO 4999**

Adalah ini diakui dan disahkan bahawa laporan PITA bertajuk: *Agrobacterium-Mediated Transformation of Rice with Omega-3-Desaturase Gene* oleh Muhammad Haziq Syahir Khaizuran, no matrik: UK22738 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah SARJANA MUDA SAINS (SAINS BIOLOGI), Fakulti Sains dan Teknologi, Universiti Malaysia Terengganu

Disahkan Oleh:

Penyelia Utama

Nama:

PROF. MADYA DR. AZIZ BIN AHMAD

Pembimbing Siswa

Jabatan Sains Biologi

Fakulti Sains dan Teknologi

Universiti Malaysia Terengganu

21030 Kuala Terengganu

Cop Rasmi:

Tarikh: 23/6/2013

Ketua Jabatan Sains Biologi

Nama:

DR. FARIDAH BT MOHAMAD

Ketua Jabatan Sains Biologi

Fakulti Sains dan Teknologi

Universiti Malaysia Terengganu

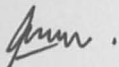
21030 Kuala Terengganu

Cop Rasmi:

Tarikh: 23/6/2013

## DECLARATION

I hereby declare that this PITA research entitled *Agrobacterium*-Mediated Transformation Of Rice With *Omega-3-Desaturase Gene* is the result of my own research except as cited in the references.

Signature : 

Name : MUHAMMAD HAZIQ SYAHIR BIN KHAIZURAN

Matrix No : UK22738

Date : 23/6/2013

*Agrobacterium*-mediated Transformation of Rice with  
*Omega-3-Desaturase Gene*.

ABSTRACT

For more than two decades, acetosyringone is the phenolic compound used in *Agrobacterium*-mediated transformation using callus derived from seed as a starting material. In the present study, the efficiency of vanillin in *Agrobacterium*-mediated transformation of *omega-3-desaturase gene* into rice calli was investigated. The results showed that vanillin concentration at 200  $\mu\text{M}$  produced the highest percentage of putative transformant on the antibiotic screening medium and  $\beta$ -glucuronidase (GUS) assay compared to control and 400  $\mu\text{M}$  of vanillin. The ability of vanillin in activating *vir* gene provides an alternative phenolic compound for *Agrobacterium*-mediated gene transformation of rice.

# Transformasi Padi Dengan Gen *Omega-3-Penyahtepu* Dibantu Oleh *Agrobacterium*

## ABSTRAK

Selama lebih dua dekad, hampir kesemua kajian transgenik tumbuhan tertumpu kepada penggunaan acetostyringon. Kajian ini telah mengkaji kecekapan vanillin dalam transformasi padi dengan gen *enzim omega-3-penyahtepu* dibantu oleh *Agrobacterium* menggunakan kalus diperoleh dari benih sebagai bahan permulaan. Hasil daripada eksperimen ini menunjukkan bahawa 200 µM kepekatan vanillin menghasilkan peratusan transformasi kalus yang tinggi dalam saringan antibiotik dan pewarnaan biru β-glukuronidase (GUS) berbanding 0 dan 400 µM vanillin. Keupayaan vanillin dalam mengaktifkan gen *vir* ini memberikan sebatian fenolik alternatif untuk transformasi padi yang dibantu oleh *Agrobacterium*.

CHAPTER 1 LITERATURE REVIEW 1

1.1 Introduction 1

1.2 Genetic Engineering 1

1.3 Agrobacterium 1

1.4 Plant Transformation 1

1.5 Rice 1

1.6 Omega-3 fatty acids 1

1.7 Vanillin 1

CHAPTER 2 MATERIALS AND METHODS 2

2.1 Materials 2

2.2 Methods 2

2.3 Transformation 2

2.4 Selection 2

2.5 PCR Analysis 2

2.6 GUS Assay 2

CHAPTER 3 RESULTS 3

3.1 Transformation Efficiency 3

3.2 GUS Assay 3

CHAPTER 4 DISCUSSION 4

CHAPTER 5 CONCLUSION 5

REFERENCES 6

APPENDICES 7

CONCLUSION 8