

***IN VITRO* REGENERATION OF BAKAWALI (*Epiphyllum oxypetalum*)**



**RESEARCH MANAGEMENT INSTITUTE (RMI)
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR
MALAYSIA**

BY :

**ASMAH AWAL
SHAMSIAH ABDULLAH
ABDUL RAZAK BABA
NAZATUL ASIKIN MUDA
NURUL IZZATI OSMAN**

FEBRUARY 2013

Contents

1. Letter of Report Submission iii

2. Letter of Offer (Research Grant)..... iv

3. Acknowledgements v

4. Report 1

 4.1 Proposed Executive Summary 1

 4.2 Enhanced Executive Summary..... 2

 4.3 Introduction 3

 4.4 Brief Literature Review 5

 4.5 Methodology..... 8

 4.6 Results and Discussion 11



 4.7 Conclusion and Recommendation..... 16

 4.8 References/Bibliography 17

5. Research Outcomes..... 19

6. Appendix 20

2. Letter of Offer (Research Grant)

Surat Kami Tankh	600-RMI/ST/DANA 5/3/Dst (70/2011) 28 Februari 2011	 
Dr Asmah Awai Fakulti Perladangan dan Agroteknologi Universiti Teknologi MARA 40450 Shah Alam		
Y. Brs. Prof./Tuan/Puan		
KELULUSAN PERMOHONAN DANA KECEMERLANGAN 02/2011		
Tajuk Projek	In Vitro Regeneration of Bakawali (Epiphyllum Oxypetalum)	
Kod Projek	600-RMI/ST/DANA 5/3/ Dst (70/2011)	
Kategori Projek	Kategori G (2011)	
Tempoh	15 Februari 2011 – 14 Februari 2013 (24 bulan)	
Jumlah Peruntukan	RM 8 000 00	
Ketua Projek	Dr Asmah Awai	

Dengan hormatnya perkara di atas adalah dirujuk.

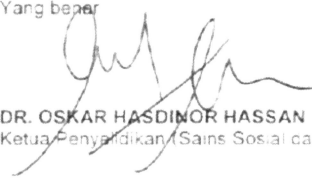
- Sukacita dimaklumkan pihak Universiti telah meluluskan cadangan penyelidikan Y. Brs. Prof./Tuan/Puan untuk membiayai projek penyelidikan di bawah Dana Kecemerlangan UTM.
- Bagi pihak Universiti kami mengucapkan tahniah kepada Y. Brs. Prof./Tuan/Puan kerana kejayaan ini dan seterusnya diharapkan berjaya menyalakan projek ini dengan cemerlang.
- Peruntukan kewangan akan disalurkan melalui tiga (3) peringkat berdasarkan kepada laporan kemajuan serta kewangan yang mencapai perbelanjaan lebih kurang 50% dan peruntukan yang diterima.

Peringkat Pertama	20%
Peringkat Kedua	40%
Peringkat Ketiga	40%
- Untuk tujuan mengemaskini pihak Y. Brs. Prof./Tuan/Puan adalah diminta untuk melengkapkan semula kertas cadangan penyelidikan sekiranya perlu mengisi borang setuju terima projek penyelidikan dan menyusun perancangan semula bajet yang baru seperti yang diluluskan. Sila lihat lampiran bagi tatacara tambahan untuk pengurusan projek.

Sekian, harap maklum.

“SELAMAT MENJALANKAN PENYELIDIKAN DENGAN JAYANYA”

Yang benar





DR. OSKAR HASDINOR HASSAN
Ketua Penyelidikan (Sains Sosial dan Pengurusan)

Penolong Naib Canselor (Penyelidikan) : 603 554 2099 / 2102
 Bahagian Penyelidikan : 603 554 2102 / 2102 / 30 / 552 / 1462
 Bahagian Perundingan : 603 554 2150 / 2150 / 2092 / 2193
 Bahagian Inovasi : 603 554 2150 / 2150 / 2274F

Bahagian Penerbitan : 603 554 2185 / 2185
 Bahagian Sokongan ICT : 603 554 2114 / 2114 / 2114
 Bahagian Sains : 603 554 2095 / 2111 / 404
 Pejabat Am : 603 554 2596 / 2597 / 552 / 1636

Penolong Penadbiran : 603 554 2094
 Fax : 603 554 2094 / 2102
 Unit Kewangan Zon 17 : 603 554 1404
 1603 552 / 1186

 Research Management Institute (RMI) Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia
<http://www.rmi.utm.edu.my>



4.2 Enhanced Executive Summary

Bakawali (*Epiphyllum oxypetalum*) belongs to Cactaceae family and is a popular ornamental plant because of their attractive and unique flowers. Leaves of bakawali have also been used as herbal remedies in Malaysian folk medicines for centuries. In term of planting, natural propagation rate of bakawali is relatively low and thus inhibits commercial propagation of this plant. For *in vitro* regeneration of bakawali, lateral buds obtained from apex, middle and basal section of sterilized young leaves were used as explant. Explant was cultured on MS media supplemented with various combinations and concentrations of BAP and NAA to determine the optimum treatment for *in vitro* regeneration. The highest frequency of multiple shoots (80%) was observed on lateral buds obtained from the basal section of bakawali leaves cultured on MS basal media after 24 weeks of culture. Well-rooted plantlets were successfully acclimatized to potting medium. Plantlet survival under *ex vitro* condition was 60-100%.

4.3 Introduction

4.3.1 Background of Research

Being a tropical country with a large portion of rainforests, Malaysia is blessed by having various types of exotic plants and herbs. Among those precious species is bakawali which is scientifically known as *Epiphyllum oxypetalum*. Bakawali belongs to Cactacea family and is also commonly known as ric rac cactus, kengwa, queen of the night, lady of the night and tan hua (Ariffin, 2005; Chooi, 2006). Efficient *in vitro* regeneration of bakawali under controlled environment determines the competency of plant tissue culture techniques in horticultural industry development. Micropropagation of bakawali is also an important step of any genetic transformation and improvement protocol because it provides sources of starting materials that can be used in genetic studies for its improvement. A proper manipulation and determination of plant growth regulators in plant tissue culture can induce embryogenesis, organogenesis and rhizogenesis of plant tissues by varying the cytokinin-to-auxin ratio in the culture media. The present study was carried out with the aim of establishing *in vitro* regeneration protocol of bakawali (*E. oxypetalum*). Lateral buds obtained from three different sections of young bakawali leaves were used as explants. A micropropagation method using culture media supplemented with various plant growth regulators (NAA and BAP) was demonstrated.

4.3.2 Problem Statement

Improved technology and the production of modern medicines nowadays had limited the application of traditional remedies. Traditional remedies are made from exotic herbs, and in the past, people used to plant these herbs around their homes. However, people nowadays tend to seek health advices from modern medicinal personnel and use synthetic medicines instead of traditional remedies. This is because it is less tedious and the sickness can be reduced in a shorter period of time. Thus, traditional treatments are no longer practiced, and the precious medicinal herbs are no longer being planted. Britton & Rose (1963) reported that bakawali is very sensitive to environmental changes in terms of potting medium, sunlight, water and frequent transplanting requirement. Therefore, the *in vitro* propagation technique is essential as an alternative method to propagate the plant. Through *in vitro* regeneration method, controlled environment is provided and the optimum growth for mass production of the species can be achieved.