



EFFECT OF NODES EXCISED FROM DIFFERENT POSITION OF *Gynura Procumbens* MOTHER STOCK PLANT ON REDUCTION OF MICROBIAL CONTAMINATION AND INCREASING IN VITRO EXPLANT SURVIVAL

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FP 2018 8

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**FACULTY OF AGRICULTURE
UNIVERSITI PUTRA MALAYSIA
SERDANG, SELANGOR DARUL EHSAN**

2017/2018

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BY
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A project report to Faculty of Agriculture, Universiti Putra Malaysia, in
fulfilment of the requirement of PRT 4999 (Final Year Project) for award
of the degree of Bachelor of Agricultural Science

FACULTY OF AGRICULTURE
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2017/2018

ENDORSEMENT

This project report entitled “Effect Of Nodes Excised From Different Position Of *Gynura Procumbens* Mother Stock Plant On Reduction Of Microbial Contamination And Increasing In Vitro Explant Survival” is prepared by Nurul Shaffiqqa binti Aziz and submitted to the Faculty of Agriculture in fulfilment of requirement of PRT 4999 (Final Year Project) for award of the degree of Bachelor of Agricultural Science.

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ACKNOWLEDGEMENT

I express my greatest thankfulness to the Almighty God for giving me good health, strength, patience and wisdom to complete this final year project successfully. I also show my deepest gratitude to my excellent supervisor, Encik Azmi bin Abdul Rashid for his guidance, assistance, patience, and understanding during the project progression.

I would like to take this opportunity to thank all the staff in the *In Vitro* Laboratory, Department of Agriculture Technology for giving me permission to use lab facilities and preparing apparatus and materials needed for my project. Especially, Puan Rohani and Encik Sharifudin for helping me in media culture guidance until culturing explant technique because this is my first time conducting the tissue culture experiment. In additional, I like to extend my appreciation to my final year project partner, Nur Syazwani for her effort and endless help during the project progression.

I would like to thank my beloved family. Specially, my parents, Encik Aziz bin Harun and Puan Azlina binti Zakaria for their support and encouragement throughout the project. Last but not least, I would like to express my sincere gratitude to my friend, Muhamad Enes Hossien bin Mohd Sies for his endless help and support to me.

TABLE OF CONTENTS

ENDORSEMENT	i
ACKNOWLEDGEMENT	ii
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF ABBREVIATIONS	vii
ABSTRACT	viii
ABSTRAK	ix
CHAPTER 1	
INTRODUCTION	1
1.1 Background of <i>Gynura procumbens</i>	1
1.2 Problem Statement	2
1.3 Objective of Experiment	3
CHAPTER 2	
LITERATURE REVIEW	4
2.1 Botany of <i>Gynura procumbens</i> and use of the plant.....	4
2.2 <i>In Vitro</i> Culture Technique	4
2.3 Contamination of Explant	5
2.4 Explant Browning	6
2.5 Explant Sterilization.....	7
CHAPTER 3	
METHODOLOGY	8
3.1 Stock Solution and Media Preparation.....	8
3.2 Explant Collection and Selection.....	10
3.3 Aseptic Method.....	10
3.4 Sterilization and Inoculation of Explant	11
3.5 Culture Incubation	12
3.6 Treatment	13
3.7 Parameters observed	14
3.8 Experimental Design and Data Analysis	15

CHAPTER 4	
RESULT AND DISCUSSION	16
CHAPTER 5	
CONCLUSION	24
APPENDICES	
APPENDIX A	
BASAL STOCK MEDIUM.....	25
MS (MURASHIGE & SKOOG, 1962) FORMULATION.....	26
APPENDIX B	
STATISTICAL ANALYSIS	27
BIBLIOGRAPHY	30

LIST OF TABLES

TABLE	TITLE	PAGE
Table 3.6.1.	The sterilization treatment for different nodal segment explants of <i>Gynura procumbens</i> obtained from the mother plant.	14
Table 4.1.	Effect of different node positions on the mother plant on reduction of fungal and bacterial contamination, explants browning and explant survival after two weeks of culturing.	19

LIST OF FIGURES

FIGURE	TITLE	PAGE
Figure 3.1.1.	The stock solution are prepared according to Murashige & Skoog (1962) formulation.	8
Figure 3.1.2.	The MS medium after autoclaving. The vials are arrange in a slanting position to allow the medium to slope better inoculation of explant.	9
Figure 3.5.1.	The node explants cultured in the vials are kept in the incubation room.	12
Figure 3.6.1.	Different position of nodes (shown in numbering label) on the mother plant are used in the study.	13
Figure 4.1.	Explant on first day of culture in MS medium.	16
Figure 4.2.	Elongation of bud occurred after five days of culturing the explant in the medium.	17
Figure 4.3.	Axillary branching occurs where the axillary buds elongate and start to branch.	17
Figure 4.4.	Multiple buds protrude from the explant after four to five weeks.	18
Figure 4.5.	(A) Fungal contamination at the base of the node explant. (B) Fungal contamination at the surface of the explant. Fungal contamination was observed after culturing the node explant.	20
Figure 4.6.	The surface of the culture medium with the mycelium spreading like a white cotton.	20
Figure 4.7.	Bacterial contamination. (A) Bacteria oozes out from the wounded surface at the base of the explant after five days of culture. (B) It later formed milky colony within two weeks covering the surface of the culture media..	21
Figure 4.8.	Bacterial colony competing with the explant for growth which later caused death of the explant.	22

LIST OF ABBREVIATIONS

MS	Murashige & Skoog
cm	centimetre
mg/L	milligram per liter
pH	Acidity scale
°C	Degree Celsius
±	Plus minus
UV	Ultraviolet
kPa	kilo Pascal
$\mu\text{mol/m}^2/\text{s}$	Light intensity unit

ABSTRACT

Gynura procumbens belongs to the Asteraceae family. This plant grows naturally in tropical Asia countries such as Malaysia and Indonesia. Its common name is longevity spinach or 'sambung nyawa' in Malay. It is a small herbaceous plant with ovate-elliptic leaves and is commonly used as a medical plant. Its leaves contain bioactive compound that can cure several diseases such as cancer, hypertension, diabetes mellitus, kidney discomfort, and inflammation. The common propagation method of this plant is through stem cutting but the number of cuttings that can be excised from a whole plant for propagation is very limited. Therefore, another alternative for mass propagation of *Gynura procumbens* plants is through tissue culture method. Currently there is no *in vitro* culture research carried out on *Gynura procumbens*. This initial study is aimed to reduce microbial contamination and to induce shoot generation from node cultures of *Gynura procumbens*. The experiment is carried out at *In Vitro* Laboratory, Department of Agriculture, Universiti Putra Malaysia (UPM) to determine the nodal segment which is less microbial contamination and to evaluate the best concentration and immersion time of explant in Clorox in reducing microbial contamination. The experiment is conducted using Completely Randomised Design (CRD). It was observed that no significant difference was observed on percentage of fungal and bacterial contamination, explants browning and explant survival by the nodes excised from different position on the mother stock plant. Fungal and bacterial contamination in these explants ranged between 16% to 73% and 6% to 20% respectively. The explant survival ranged between 80% and 90% in these explants indicating that these explants are good material for initiating culture establishment and later propagule multiplication.

ABSTRAK

Gynura procumbens tergolong dalam keluarga Asteraceae. Tumbuhan ini tumbuh secara semulajadi di negara Asia tropika seperti Malaysia dan Indonesia. Nama biasa ialah bayam panjang umur atau 'sambung nyawa' dalam Bahasa Melayu. Ia adalah tumbuhan herba kecil dengan daun ovate-eliptik dan biasanya digunakan sebagai tumbuhan perubatan. Daunnya mengandungi sebatian bioaktif yang boleh menyembuhkan beberapa penyakit seperti kanser, tekanan darah tinggi, kencing manis, ketidakselesaan buah pinggang, dan keradangan. Kaedah pembiakan umum tumbuhan ini adalah melalui pemotongan batang tetapi bilangan keratan yang boleh dikeluarkan dari seluruh tumbuhan untuk pembiakan sangat terhad. Oleh itu, satu lagi alternatif pembiakan *Gynura procumbens* untuk menghasilkan tumbuhan yang banyak adalah melalui kaedah kultur tisu. Pada masa ini tiada penyelidikan *in vitro* dijalankan pada *Gynura procumbens*. Kajian awal ini bertujuan untuk mengurangkan pencemaran mikrob dan untuk mendorong pembiakan *Gynura procumbens* daripada tunasnya. Eksperimen ini dijalankan di Makmal *In Vitro*, Jabatan Pertanian, Universiti Putra Malaysia (UPM) untuk menentukan segmen nod yang kurang pencemaran mikrob dan untuk menilai masa tumpuan dan rendaman yang terbaik dalam Clorox dalam mengurangkan pencemaran mikrob. Eksperimen ini dijalankan menggunakan Reka Bentuk Rawak Lengkap (CRD). Didapati tidak terdapat perbezaan bererti pada peratus pencemaran eksplan oleh kulat dan bakteria dan pemerangan eksplan dan peningkatan kebolehdidupan eksplan. Pencemaran eksplan oleh kulat dan bakteria pada eksplan ini berjangka antara 16% hingga 73% dan 6% hingga 20%. Kebolehdidupan eksplan pula berjangka antara 80% dan 90% pada eksplan ini menunjukkan eksplan ini adalah bahan biak yang baik untuk memulakan aruhan kultur dan seterusnya menggalakkan penggandaan propagul.

CHAPTER 1

INTRODUCTION

1.1 Background of *Gynura procumbens*

Gynura procumbens (Lour.) Merr. is an essential medicinal plant belonging to the Asteraceae family. It is a native herb in the tropical Asia countries such as Thailand, Vietnam, Myanmar, China, Indonesia and Malaysia (Dwijayanti & Rifa, 2015). It has been widely used as a traditional herbal medicine. In Malaysia, the Malays called it as 'Sambung Nyawa' which means 'prolongation of life' while the Chinese called it as 'bai bing ca' which means '100 ailments' (Bodeker et al., 2009). This plant is also well known as 'Longevity Spanish'. The distribution of this species is limited to the western part of peninsular Malaysia (Keng et al., 2009).

In this sophisticated era, the chronic ailments are very critical. Thus, people change their lifestyles to become healthier and very sensitive toward health care issues. Most research reported that the risk of varying diseases can be reduced by consuming the medicinal herbs, vegetables and fruits (Deng et al., (2013). The extracts from the plants are the best remedy of curing the diseases. Based on that fact, the traditional medicinal herbs have been widely used as ingredients in pharmaceutical product including *Gynura procumbens*.

Almost all pharmaceutical products used the plant extract as the main ingredient (Zhou & Wu, 2006). *Gynura procumbens* have also been used as ethnoherbal product (Keng et al., 2009). The most useful part of *Gynura procumbens* plant is the leaves. A few decades ago, *Gynura procumbens* leaves are often eaten raw with rice. Dwijayanti & Rifa (2015) stated that the leaves have many benefits in curing various diseases such as eruptive fever, rash, kidney disease, migraine, constipation, hypertension, diabetes mellitus and cancer. Recently, many researches have been carried out to prove the goodness of *Gynura procumbens* for maintaining good health.

1.2 Problem Statement

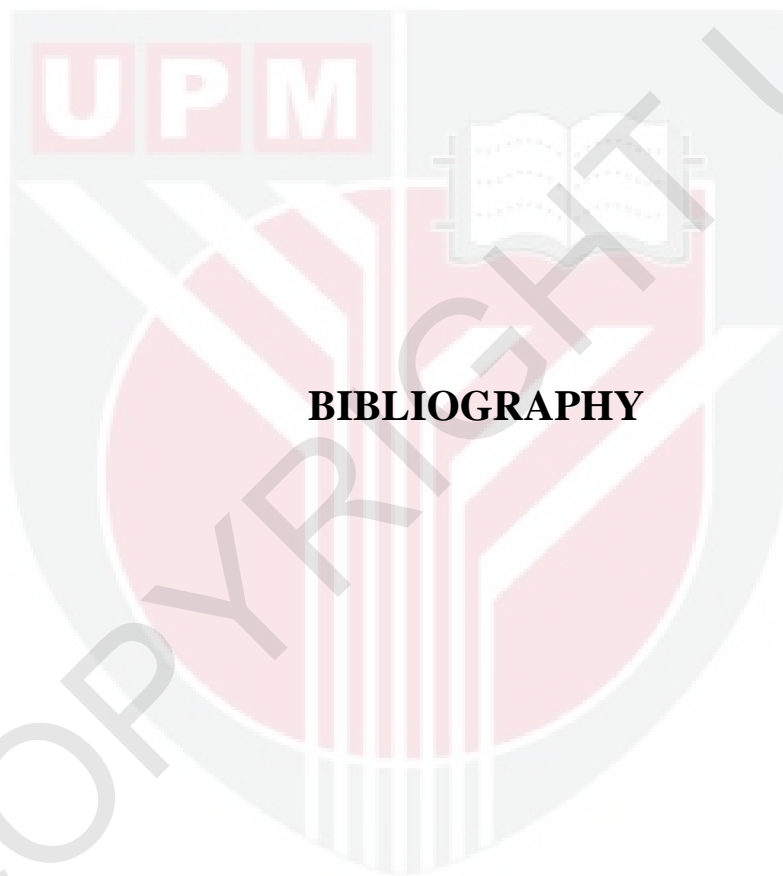
Conventionally, *Gynura procumbens* is propagated by cutting. In the preparation of pharmaceutical products, the demand of the raw material has increase due to its medicinal values. Propagation using cuttings cannot deal with the increasing demand of this plant. This is because of the limited number of stem cutting that can be excised from a whole plant. Therefore, there are less number of planting materials be produced.

In vitro propagation can be another alternative for production of *Gynura procumbens* planting materials. At present, there is not much research carried out on *in vitro* culture of *Gynura procumbens*. This initial study aims to reduce microbial contamination and induce shoot regeneration from *Gynura procumbens* node culture.

1.3 Objective of Experiment

The objectives of this initial study are:

- i. To see the effect of different node positions on the mother plant on reduction of fungal and bacterial contamination, explants browning and explant survival.



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