



***EFFECT OF DIFFERENT BAP CONCENTRATION AND SHOOT
DECAPITATION ON IN VITRO AXILLARY PROLIFERATION OF
GYNURA PROCUMBENS***

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FP 2018 16

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A project report submitted to the Faculty of Agriculture Universiti Putra
Malaysia in partial fulfillment of the requirement of the Research Project (PRT
4999) for the award of the degree in Bachelor of Agriculture Science

DEPARTMENT OF AGRICULTURE TECHNOLOGY

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SERDANG, SELANGOR

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CERTIFICATION

This project with a title, “Effect Of Different BAP Concentration and Shoot Decapitation on *In Vitro* Axillary Proliferation of *Gynura procumbens*” prepared by Nur Iffah Binti Shaari (181576) and submitted to the Faculty of Agriculture in partial fulfillment to the requirement of PRT 4999 (Final Year’s Project) for the award of the degree of Bachelor of Horticulture Sciences.

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ACKNOWLEDGEMENT

Alhamdulillah, all praises to Allah for the strengths and His blessing in completing my research project entitled Effect of Shoot Decapitation and Different BAP Concentration on Shoot Proliferation of *Gynura procumbens* by using *In Vitro* culture successfully.

I would like to express my deep and sincere gratitude to my research supervisor, En Azmi Abdul Rashid, for giving me the opportunity to do research and providing invaluable guidance throughout this research. His vision, sincerity and motivation have deeply inspired me. He has taught me the methodology to carry out the research and to present the research works as clearly as possible. It was a great privilege and honor to work and study under his guidance. I am extremely grateful for what he has offered me. Not forgotten, my appreciation to my coordinator, Dr. Farrah Melissa Binti Muharam for her support and knowledge regarding this topic.

I am extremely grateful to my beloved parents; Mr. Shaari Bin Mahmud and Mrs. Faizah Binti Ahmad for their love, prayers, caring and sacrifices for educating and preparing me for my future. I also would like to dedicate my appreciation to my sisters and brother for their endless love, encouragement and valuable prayers during my study.

Sincere thanks to my best friend Bibi Diyana Binti Japar for the kindness and moral support to complete this thesis successfully. She always support and helped me in all the time of research and writing of this thesis. Thanks for the friendship and memories.

Finally, my thanks go to all the people who have supported me to complete the research work whether directly or indirectly especially to all members in Agro Biotechnology Laboratory, Department of Agriculture Technology that continuously encourage and give me support during the completion of this project and thesis writing.



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LIST OF THE ABBREVIATIONS

ANOVA	Analysis of Variance
α	alpha
BAP	6-benzylaminopurine
cm	Centimeter
CRD	Completely Randomized Design
$^{\circ}\text{C}$	Degree Celsius
g	Gram
HCL	Hydrochloride acid
IAA	Indole-acetic acid
IBA	Indole-butyric acid
Kg	Kilogram
L	Liter
LAR	Laminar Air Flow
ml	Milliliter
mg	Milligram
mg/L	Milligram per liter
mm	Millimeter
MS	Murashige and Skoog
m	Meter

m^2	Meter square
$m^{-2} s^{-1}$	Meter square per second
NAA	Naphthalene-acetic acid
NaOH	Sodium hydroxide
%	Percentage
pH	Measure of acidity
psi	Pounds per square inch
μmol	Micromole

ABSTRACT

'Sambung nyawa' or Longevity spinach with the scientific name *Gynura procumbens* is a medicinal plant belonging to Asteraceae family. This herb is commonly found in tropical Asia countries such as China, Thailand, Indonesia, Malaysia, and Vietnam. It contains bioactive compounds such as flavonoids and glycosides and has potential in treating hypertension, diabetes, infertility, cancer and inflammation. Currently, this plant can be propagated using stem cutting and seedling but the problem is limited number of planting material can be produced and slow germination rate using seedling. At present, there are not much research been reported on plant tissue culture of *G. procumbens*. Therefore, these experiments are carried out with the objectives to investigate the effect of different BAP concentration (0, 2.0, 5.0 and 10.0 mg/L) and shoot decapitation on *in vitro* axillary proliferation of *G. procumbens*. The culture media used for both experiment is Murashige and Skoog (1962) medium. All BAP treatments including the control treatment produced 100% of shoot regeneration. The medium with supplemented with 2.0 mg/l BAP triggered the highest shoot proliferation per explant with 4.22 shoot formed per explant. Shoot tip decapitation triggers significantly shoot proliferation compared with non-decapitation treatment. It is recommended that sub-culturing of shoots be carried out after 6 weeks of culture.

ABSTRAK

'Sambung nyawa' atau 'Longevity spinach' dikenali juga dengan nama saintifik *Gynura procumbens* umbuhan herba berasal dalam Famili Asteraceae. Kebiasaan herba ini ditemui negara Asia tropika seperti China, Thailand, Indonesia, Malaysia, dan Vietnam. Ia mengandungi bahan bioaktif seperti flavonoid dan glikosida dan mempunyai potensi untuk merawat hipertensi, diabetes, kemandulan, kanser dan keradangan. Tumbuhan ini sering ditanam menggunakan pemotongan batang dan anak benih, tetapi bilangan yang boleh dihasilkan adalah terhad dan kadar percambahan pokok lambat dengan biji benih. Tidak banyak kajian mengenai tumbuhan ini menggunakan teknik kultur tisu. Oleh itu, eksperimen ini dijalankan dengan objektif untuk mengkaji penggunaan kepekatan BAP yang berlainan (0, 2.0, 5.0 dan 10.0 mg/L) dan kesan pemotongan pada percambahan pucuk *G. procumbens*. Kedua-dua eksperimen ini menggunakan media Murashige dan Skoong (1962). Semua rawatan termasuk rawatan kawalan menunjukkan 100% percambahan pucuk. Media yang mengandungi 2.0 mg/L BAP telah menghasilkan pucuk yang paling tinggi iaitu 4.22 tunas terhasil bagi satu eksplan. Manakala, rawatan dengan pemotongan pucuk menghasilkan pucuk yang lebih tinggi berbanding rawatan tanpa pemotongan. Penanaman semula pokok adalah disyokkan pada minggu ke 6 selepas di kulturkan.

CHAPTER 1

1.0 INTRODUCTION

Gynura procumbens also known as ‘Sambung Nyawa’ or Longevity spinach in common name is a perennial herbaceous plant belonging to the Asteraceae family. This plant is distributed from tropical Africa to South East Asia and Australasia with one species in tropical Australia. It is also commonly found in tropical Asian countries such as Vietnam, China, Thailand, Indonesia and Malaysia. In Malaysia, the fresh and crunchy *G. procumbens* leaves are commonly eaten fresh in the same way as salad while, in Thailand its leaves are used in cooking and also processed as pure juice (Kaewseejan *et al.*, 2015).

This plant is a medicinal plant that has high nutrition value and good for health. It is widely used in many countries as remedy for curing cancer, fever, urinary infection, allergies, hypertension, diabetes, migraine and kidney discomfort (Tan *et al.*, 2016). Recently, researchers have found some the beneficial bioactive compound in this plant such as amino acid, carotenoids, alkaloids, flavonoids and glycosides. The entire bioactive element is very useful in treating the diseases (Akowuah *et al.*, 2001, 2002).

G. procumbens is an anti-cancer plant which can inhibit the growth of cancer cell. The detoxification of carcinogenic compounds in *G. procumbens* is very helpful to prevent the initiation phase formation of cancer (Hamid *et al.*, 2009; Ghofur *et al.*, 2015). The leaves of *G. procumbens* which contain the protein fraction such as Malate dehydrogenase have potential use as a protein-based chemotherapeutic agent for breast cancer treatment (Hew *et al.*, 2013).

G. procumbens can also be used to increase the sperm quality and level of testosterone of male and can decrease the level of glucose in blood which causes diabetes mellitus. According to Pusparanee *et al.*, (2015) claims that *G. procumbens* extract can increase the quality of sperm (206.89%), level of testosterone (16.71%) and decrease about 38.71% of blood glucose level in human.

Besides the medicinal properties, *G. procumbens* also have potential in commercial uses. The valuable properties that contain in this plant are used as an ingredient in special diet for patient who is suffering from heart disease and liver disease (Chen *et al.*, 2013). This plant can also be processed and used as tea for commercialize. According to Via Vitae company in Cyprus, *G. procumbens* are plant organically and processed into tea to fight kidney disease, hypertension, diabetes and eruptive fever, rashes and other types of illnesses related to diet and lifestyle (Via Vitea, 2017). Thus, the demands of this plant are higher. But, not many people are planting this plant for commercialization at present.

Currently, *G. procumbens* are propagated by stem cutting and seed. These method of propagation will produce lower number of planting materials due to limited number of stem cuttings can be excised from a whole plant. The rate of growth by using seedling is lower and slow. It takes about eight to ten weeks for growth. Therefore, *in vitro* propagation is an alternative method for increasing the production of *G. procumbens* planting materials. Currently, not much has been investigated on *in vitro* culture of *G. procumbens*. These studies are carried out with the objectives to see the effect of different BAP concentration and shoot decapitation on *in vitro* axillary proliferation from *G. procumbens* shoot tip explant and node cultures respectively.

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