



UNIVERSITI PUTRA MALAYSIA

**IN VITRO REGENERATION RESPONSES OF CALLUS OF
Catharanthus roseus (L) G.DON. TO PLANT GROWTH REGULATORS
AND CHITOSAN TREATMENTS**

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SERDANG, SELANGOR**

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NORHAFIZAH BTE GANDOH

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

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UNIVERSITI PUTRA MALAYSIA**

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CERTIFICATION

This final year project report *In Vitro* Regeneration Responses of Callus of *Catharanthus roseus* (L) G.Don. To Plant Growth Regulators and Chitosan Treatments was written by Norhafizah Bte Gandoh and submitted to the Faculty of Agriculture, Universiti Putra Malaysia (UPM) in fulfilment of requirement of PRT4999 for the award of Bachelor of Horticultural Science.

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LIST OF ABBREVIATIONS

<i>et al.</i>	and others
ANOVA	Analysis of variance
°C	Degree Celsius
IBA	Indole-3-Butyric acid
HCL	Hydrochloric acid
pH	Hydrogen ion concentration
L	Liter
mg/L	Milligram per liter
MS	Murashige and Skoog
NAA	Napthaleneacetic acid
%	Percentage

ABSTRACT

The present study was conducted to establish *in vitro* regeneration responses of callus of *Catharanthus roseus* to chitosan treatments in combination with PGR (IBA+NAA). Leaf petioles from 5 weeks old plants were used as explant callus initiated was cultured on half MS (Murashige and Skoog, 1974) media containing PGR and different concentrations of chitosan. The callus was cultured in medium supplemented with (0, 1, 2, 3, 4 and 5 mg/L) chitosan in 16 treatments combination of IBA and NAA each with (0, 1.5, 3.0, and 4.5 mg/L). The parameters used to assess growth and development of callus was number of roots, length of roots and dry weight of callus. The experiment was conducted in a complete randomized design (CRD) in 3 replications. Medium containing 5 mg/L chitosan shows high dry weight of with 0.786 g and treatment with 2 mg/L of chitosan gave the highest number and longest length of roots with 53.66 and 2.47 cm respectively. The study shows positive effects of chitosan on *C. roseus*.

ABSTRAK

Satu kajian telah dijalankan bagi menentukan tindakbalas pertumbuhan in vitro pada kalus Catharanthus roseus terhadap rawatan kitosan dengan gabungan kepekatan PGR (IBA+NAA). Petiol daun pada pokok berusia 5 minggu digunakan sebagai eksplan kalus yang di kultur pada separuh MS media yang mengandungi PGR dan tahap kepekatan kitosan yang berbeza. Kalus dikulturkan dalam medium (0 , 1 , 2 , 3 , 4 dan 5 mg / L) kitosan dan 16 rawatan yang terdapat kombinasi IBA dan NAA (0 , 1.5 , 3.0 , dan 4.5 mg/L). Parameter yang digunakan untuk melihat pertumbuhan dan perkembangan kalus adalah bilangan akar, panjang akar dan berat kering kalus. Eksperimen ini dijalankan dengan menggunakan Rekabentuk Rawak Lengkap (CRD) dengan 3 replikasi. Medium yang mengandungi 5 mg/L kitosan menunjukkan berat kering kalus yang tinggi dengan 0.786 g dan rawatan dengan 2 mg/L kitosan memberikan jumlah dan kepanjangan tertinggi bagi pertumbuhan akar dengan 53.66 dan 2.47 cm. Hasil dari kajian menunjukkan kesan positif kitosan terhadap C. roseus.

CHAPTER 1

INTRODUCTION

Catharanthus roseus (L) G. Don. commonly known as periwinkle, is a common plant in many tropical and subtropical regions of the world. It is an evergreen sub-shrub and herbaceous plant growing up to 1 m in height. *C. roseus* is a popular garden as well as landscape plant grown for its beauty and color.

C. roseus has also been used in traditional medicine for treatments against several diseases. The species has been found to have pharmacological properties such as antibacterial, antifungal, antioxidant, anticancer and antiviral activities in a number of alkaloids. The two most important ones are vincristine and vinblastine. There has been report on the production of alkaloids through plant cells and callus.

This study examines the *in vitro* regeneration responses of callus of *C. roseus* to chitosan treatment and effects of auxin concentration (IBA+NAA) on callus growth and development. The treatment is the combination of PGR to establish optimum concentration producing good shoot and root growth in *C. roseus*.

1.1 Hypothesis

1.1.1 Null hypothesis

Chitosan gives significant effect on differentiation of callus of *C. roseus*.

1.1.2 Alternative hypothesis

Chitosan gives no significant effect on differentiation of callus of *C. roseus*.

1.2 Objective

The present study is conducted to observe the effects of chitosan on the differentiation of callus of *C. roseus*. The study establishes the optimum concentration of chitosan for the culture of callus with high differentiation capability.

CHAPTER 6

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