



UNIVERSITI PUTRA MALAYSIA

***THE GROWTH OF TYPHONIUM FLAGELLIFORME TREATED WITH
DIFFERENT LEVELS OF THIDIAZURON AND N6-
BENZYLAMINOPURINE***

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BY

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**A project report submitted to Faculty of Agriculture, Universiti Putra Malaysia
in fulfillment of the requirement of PRT4999 (Final Year Project)
for the award of the degree of Bachelor of Agricultural Science**

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CERTIFICATION

This project report entitled 'The growth of *Typhonium flagelliforme* treated with different levels of Thidiazuron and N⁶-benzylaminopurine' is prepared by Vajidah Sunoto @ Hj. Faisal and submitted to the Faculty of Agriculture in fulfillment of the requirement of PRT4999 (Final Year Project Research) for the award of the degree of Bachelor of Agriculture Science.

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LIST OF ABBREVIATIONS

| | |
|-------|--|
| ANOVA | Analysis of variance |
| BAP | N ⁶ – Benzylaminopurine |
| cm | Centimeter |
| CRD | Complete Randomized Design |
| DMRT | Duncan Multiple Range Test |
| g | Gram |
| HCl | Hydrochloric acid |
| mg/L | Milligram per litre |
| ml | Milliliter |
| MS | Murashige and Skoog Medium |
| NAA | Naphthalene Acetic Acid |
| NaOH | Sodium hydroxide |
| NDM | New Dogashima Medium |
| ns | No significant difference at $p \leq 0.05$ |
| pH | Acidic scale |
| p.s.i | Pressure square inch |
| TDZ | Thidiazuron |
| °C | Degree Celcius |
| * | Significant different at $p \leq 0.05$ |
| ** | Significant difference $p \leq 0.01$ |
| % | Percent |

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ABSTRACT

Since it has known as herbal therapies for cancer treatment, the demand for *Typhonium flagelliforme* plant is high. Shortage of high quality planting materials has limited the supply of this plant. Through *in vitro* technique, mass multiplication of rodent tuber has been achieved. Thus a study was conducted at Cell Biology and Genetics Laboratory, Department of Agriculture Technology, Faculty of Agriculture. An experiment was conducted using two different cytokinins, BAP and TDZ in New Dogashima Medium at various levels of concentrations for this study. The objectives of this study are to study the effect of different concentrations of BAP and TDZ on the multiplication of *T. flagelliforme* on modified NDM medium and to determine the best concentration of hormones used for mass propagation of *T. flagelliforme*. The explant used was very small portion of tuber. A series of explant sterilizations were conducted before undergo culturing process. Twelve treatments used are BAP and TDZ with 0, 0.25, 0.5, 1, 3, and 5 mg/L respectively, added with 0.1 mg/L NAA to induce root growth for complete growth of individual plant. The explants were subcultured onto similar fresh media every 2 weeks. Parameters that were recorded include fresh weight of culture (g), explant height (cm), number of shoot(s) and root(s) per explant. Percent of contamination and dead of explant were also recorded. This study was conducted using Complete Randomized Design (CRD) and data were analyzed using the Analysis of Variance (ANOVA) and Duncan Multiple Range Test (DMRT) was employed for comparison between means. After several weeks of culture, the results showed that there were significant differences on the growth of explants among all the treatments.

ABSTRAK

Semenjak terkenal sebagai tumbuhan herba yang mempunyai nilai perubatan yang tinggi dan mampu melawan kanser, permintaan terhadap Keladi Tikus (*Typhonium flagelliforme*) semakin meningkat. Bagi mengatasi kekurangan dalam mendapatkan sumber bahan tanaman yang sihat berkualiti, satu kajian menggunakan teknik kultur tisu telah dibuat di Makmal Biologi Sel & Genetik, Jabatan Teknologi Pertanian, Universiti Putra Malaysia. Dua hormon cytokinin yang berbeza iaitu BAP dan TDZ dengan kepekatan yang berbeza diuji dan dikultur ke New Dogashima Medium. Tujuan eksperimen dijalankan adalah untuk mengkaji kesan BAP dan TDZ pada tahap kepekatan yang berbeza dan mengetahui cytokinin yang paling sesuai digunakan untuk pertumbuhan *T. flagelliforme*. Ekplan yang digunakan adalah bahagian pangkal pokok beserta sedikit tuber dan beberapa siri pensterilan ekplan dibuat sebelum proses kultur dijalankan. Sebanyak 12 rawatan dikendalikan iaitu BAP dan TDZ berserta 0, 0.25, 0.5, 1, 3, dan 5 mg/L masing-masing. Kedua-dua BAP dan TDZ dicampur 0.1 mg/L NAA bagi menggalakkan pertumbuhan akar bagi agar tumbuh dengan sempurna. Ekplan disubkultur ke dalam media baru yang sama setiap 2 minggu. Pemerhatian yang dicatatkan adalah berat basah (g), ketinggian ekplan (cm), bilangan pucuk dan akar bagi setiap ekplan. Peratusan kontaminasi dan kematian juga diambil kira. Kajian yang dijalankan ini menggunakan Rekabentuk Rawak Penuh (CRD). Data yang diambil setiap 2 minggu dianalisis menggunakan analisis varians (ANOVA) dan perbandingan purata diambil menggunakan prosedur Duncan (DMRT). Selepas beberapa minggu, keputusan menunjukkan ada perbezaan bererti di dalam pertumbuhan ekplan.

CHAPTER 1: INTRODUCTION

1.1 Introduction



Figure 1. *Typhonium flagelliforme*

Typhonium flagelliforme (Lodd.) Blume is a plant under Plantae Kingdom. It belongs to family Araceae. *Typhonium* is the genus name and *flagelliforme* is the species. The common name for this plant is Rodent Tuber or called Keladi Tikus in Malays.

Typhonium species are common in Malaysia lowlands, frequently found in disturbed places (Dassanayake *et al.*, 1988). The plant *Typhonium flagelliforme*, (Figure 1) also known as the ‘rodent tuber’, is often included as an essential ingredient in various herbal remedies recommended for cancer therapies in Malaysia. The tuber tissue was found to be a good explant for inducing asexual propagation system

(Ding *et al.*, 2011). The plant is widely distributed in soft, damp and shady habitats in Southeast Asia, extending even to Northern Australia and South India (Lai *et al.*, 2008).

Typhonium flagelliforme is a medicinal herb which is endowed with curative properties against a variety of illness including injuries, oedema, coughs, pulmonary ailments, bleeding and cancer (Nobakht *et al.*, 2010).

A high increasing interest of using herbal medicine and traditional medicine was reported by World Health organization (Tilburt and Kaptchuk, 2008). However, herbal medicines, like other natural resources, have very limited sources. Thus artificial regeneration of herbal plants becomes important (Nobakht *et al.*, 2009).

As news spread about the benefits of the herbs, much of what left in the wild are being harvested, depleting the natural resource. Consequently, this herbal plant must be widely grown instead of relying on the wild. Therefore there is a need to mass propagate this species to enable consistent and adequate supply of the planting materials for large-scale planting (Shabariah, 2011).

1.2 Justification and problem statement

Considering that *Typhonium flagelliforme* is an endangered species and the availability of planting material is scarce, the use of tissue culture technique provides a rapid method to mass produce the plant.

1.3 Objectives

Specific objectives for this research are:

- 1.3.1 To study the effect of different concentrations of BAP on the multiplication of *Typhonium flagelliforme* on modified NDM medium.
- 1.3.2 To study the effect of different concentrations of TDZ on the multiplication of *Typhonium flagelliforme* on modified NDM medium.
- 1.3.3 To determine the best concentration of hormones that can be used for mass propagation of *Typhonium flagelliforme*.

1.4 Hypothesis

High multiplication of individual plant of *Typhonium flagelliforme* can be produce through *in vitro* technique and will provide adequate disease-free planting material resource supply for future.

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