UNIVERSITI PUTRA MALAYSIA

EFFECT OF DIFFERENT BAP AND TDZ CONCENTRATION ON SHOOT MULTIPLICATION FROM SHOOT TIP EXPLANT OF Dianthus caryophyllus

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By

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Certification Form

This project entitled "Effect of different BAP and TDZ concentration on shoot multiplication from shoot tip explant of *Dianthus caryophyllus*" was done by Maryam Shakirah Binti Zainal Abidin and submitted to the Faculty of Agriculture, Universiti Putra Malaysia (UPM) in fulfilment of requirement for PRT 4999 for the degree of Bachelor of Agriculture Science.

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List of Abbreviations

BAP	6-benzylaminopurine
TDZ	Thidiazuron
PGR	Plant Growth Regulator
%	Percentage
mg/L	Milligram per litre
ml	Milliliter
˚C	Degree Celsius
ANOVA	Analysis of Variance
Ns	No significant difference
SAS	Statistical Analysis System
MS	Murashige and Skoog
RCBD	Randomized Complete Block Design

Abstract

Dianthus caryophyllus is known as carnation or bunga teluki. It is a monoecious perennial plant. In Malaysia, carnation is used as cut flower for many occasions and events. Seeds of carnation can produce virus free plant. However, one seed can only generate one plant. To produce mass numbers of virus free carnation plants, propagating carnation through in-vitro could be an alternative approach by the growers. Besides that, in-vitro culture technique reduces the spaces needed for micropropagating the plants and also plants can be produced within a shorter period of time. The objective of this study is to determine the best BAP and TDZ concentration in inducing shoot proliferation from shoot tip explant of carnation. The explant used is shoot tip excised from 12 days old germinated seedling of *dianthus caryophyllus*. This explants are cultured in Murashige and Skoog (1962) medium supplemented with 6-benzylaminopurine (BAP) at concentrations of 0.5, 1, 2, and 5 mg/L and Thidiazuron (TDZ) at 0.02, 0.09, 0.22, and 1.1 mg/L. It is observed that there is an inconsistent trend in shoot multiplication with increasing BAP and TDZ concentrations. The highest mean number of shoots formed per explant was observed in medium supplemented with1.1 mg/L TDZ. It is also observed that the medium without cytokinin (control treatment) also induced shoot multiplication indicating that endogenous hormone might have triggered the shoot induction.

Abstrak

Dianthus caryophyllus dikenali sebagai carnation atau bunga teluki. Ia adalah tumbuhan saka monoecious. Di Malaysia, bunga teluki digunakan sebagai bunga potong untuk majlis dan acara. Benih bunga teluki boleh menghasilkan tumbuhan bebas virus. Walau bagaimanapun, satu biji hanya boleh menjana satu anak pokok. Melahirkan bunga teluki bebas virus secara besar-besaran, bunga teluki boleh dijana melalui in-vitro yang boleh menjadi pendekatan alternatif oleh penanam. Di samping itu, teknik in-vitro boleh mengurangkan penggunaan ruang yang diperlukan untuk pembiakan mikro tumbuh-tumbuhan dan menghasilkan dengan tempoh yang lebih singkat. Objektif kajian ini adalah untuk menentukan kepekatan BAP dan TDZ terbaik dalam mendorong penghasilan bunga teluki dari pucuk eksplan. Eksplan yang digunakan adalah "shoot tip" dihasilkan daripada anak benih *Dianthus caryophyllus* yang telah bercambah 12 hari. Eksplan ini dikultur dalam medium Murashige dan Skoog (1962) yang ditambah dengan 6- benzylaminopurine (BAP) pada kepekatan 0.5, 1, 2 , dan 5 mg/L dan Thidiazuron (TDZ) pada 0.02 , 0.09 , 0.22, dan 1.1 mg / L. Adalah diperhatikan bahawa terdapat trend yang tidak konsisten dalam percambahan pucuk dengan peningkatan kepekatan BAP dan TDZ . Bilangan min tertinggi pucuk terbentuk per eksplan diperhatikan dalam yang diperkaya dengan 1.1 mg/L TDZ. Permerhatian pada medium tanpa cytokinin (rawatan kawalan) juga mengeluarkan pucuk. Ini menunjukkan bahawa hormon dalaman mungkin telah mencetuskan induksi percambahan pucuk.

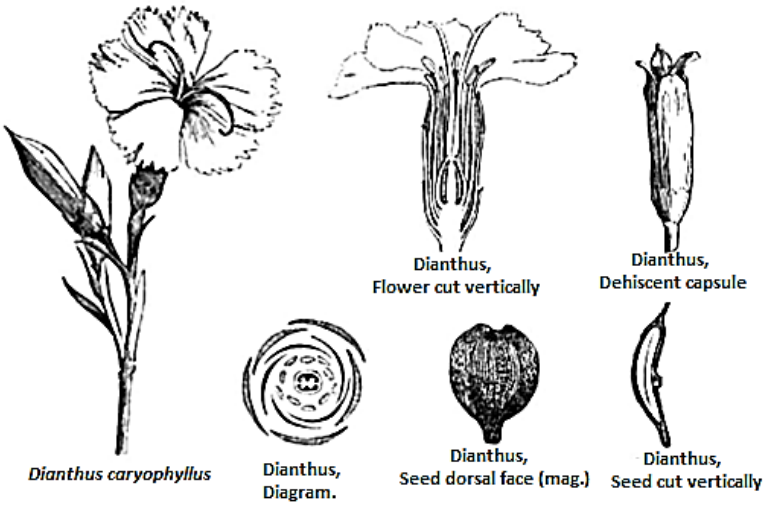
Chapter 1

Introduction

1.1 Introduction

Carnation or teluki is a common name for various species of the genus Dianthus, which belong to the caryophyllaceae family (order: caryophyllales). All species in this family are dicotyledonous. This family consist of 80 genera and 2000 species which grow either as annuals or perennials. Dianthus have been identified consisting of 300 species. *Dianthus caryophyllus* has been used extensively by breeders for centuries and many cultivated varieties and hybrid have been developed, and named by features of the flower described (Galbally and Galbally 1997; Jurgens *et al*. 2003). Dianthus genus member's origins range are from southern Russia to Greece and the Auvergne mountain of France. At cooler alpine regions of Europe, Asia, and Mediterranean coastal regions, dianthus species are also adapted.

Carnation is a semi hardy herbaceous perennial plant with thick, narrow, linear and succulent leaves. Leaf blades are simple, entire, linear, glaucous, arranged in pairs, (Jaggi, 2013) keeled and five nerved and their colour varies from green to grey blue or purple. The stems are hardy, shiny and have one to three angles with tumid joints. Flowers are bisexual and occasionally unisexual. The flower colour varies from white to pink or purple in colour shown in the figure. When grown in gardens, flowers grow between 6 and 8.5 cm in diameter. Petals are broad with frilled margins and calyx is cylindrical with bracts at the base.



Carnations are excellent for cut flowers, bedding, pots, borders, edging, indoors and rock gardens. Though cut carnations are traded in the world market year round, they are in high demand during the Valentine's Day, Easter, Mother's Day and Christmas. They were known as Jove's flower in ancient Rome as a tribute to one of their beloved gods. Miniature carnations are now gaining popularity for their potential use in floral arrangement. The flower petals of carnation are candied, used as a garnish in salads and for flavouring fruit, fruit salads, etc. They are also used as a substitute for rose petals in making syrup after removing the bitter white base. (Jaggi, 2013)

Carnations are commercially utilized for extraction of perfume in France and the Netherlands. The volatile oil of carnation contains 40% benzyl benzoate, 30% eugenol, 7% phenylethyl alcohol, 5% benzyl salicylate and 1% methyl salicylate. About 100g of oil is obtained from 500kg of flowers (Jaggi, 2013)

1.2 Objective

The main objective of this study is to determine the best type and concentration of cytokinin in inducing in vitro multiple shoot formation of carnation.

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