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MICROPROPAGATION OF F1 HYBRID BRINJAL (Solanum melongena L.)

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FACULTY OF AGRICULTURE

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MICROPROPAGATION OF F1 HYBRID BRINJAL

(*Solanum melongena* L.)

By

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CERTIFICATION

This project report entitled Micropropagation of F1 Hybrid Brinjal, prepared by Nurelia Azian Binti Mohamad Nazir (158592) in partial fulfillment of requirement of PRT4999 (Final Year Project) for the award of the Degree of Bachelor of Agricultural Science.

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%	Percentage
°C	Degree celcius
ANOVA	Analisis of Variance
BAP	6-benzylaminopurine
Mg/L	Miligram per liter
mL	Mililiter
cm	Centimeter
MS	Murashige and Skoog
pH	Hydrogen ion concentration
NaOH	Sodium Hydroxide
HCl	Hycrochloric acid

ABSTRACT

This study was conducted to determine the best concentration of 6-benzylaminopurine (BAP) or kinetin on shoot multiplication from shoot tip explant of F1 hybrid brinjal (*Solanum melongena*). The shoot tips derived from germinated seedling were used as explants and cultured on half strength Murashige and Skoog (MS) medium supplemented with different BAP or kinetin concentration. This experiment was carried out at the Tissue Culture Laboratory, Department of Agriculture Technology, Universiti Putra Malaysia, Serdang. Seven cytokinin treatments were used in this experiment which were 0.0, 1.0, 2.0, 5.0 mg/L BAP and 1.0, 2.0, 5.0 mg/L kinetin. The experiment was conducted using Completely Randomized Design (CRD) with 10 replications per treatment and 10 explants in each replication. It was observed that the medium containing 1.0 mg/L kinetin induced the highest mean number of shoots per explants (0.91) after 5 weeks of culture but was not significantly different compared with the control treatment and other BAP and kinetin treatments. The highest mean number of shoots (0.92) proliferated after 3 weeks of subculture was on medium supplemented with 1.0 mg/L BAP but also showed no significant difference compared with the control treatment as well as other BAP and kinetin treatments except 1.0 mg/L kinetin which showed a significant reduction on mean number of shoots formed per explant.

ABSTRAK

Kajian ini dijalankan untuk menentukan kepekatan terbaik 6-benzylaminopurine (BAP) atau kinetin pada penggandaan pucuk dari eksplan hujung pucuk F1 terung hibrid (*Solanum melongena*). Hujung pucuk diperolehi daripada anak benih terung hibrid yang tercambah digunakan sebagai eksplan dan dikulturkan pada separuh Murashige dan Skoog (MS) medium yang mengandungi kepekatan BAP atau kinetin yang berbeza. Eksperimen ini telah dijalankan di Makmal Kultur Tisu, Jabatan Teknologi Pertanian, Universiti Putra Malaysia, Serdang. Tujuh rawatan cytokinin digunakan dalam eksperimen ini iaitu 0.0, 1.0, 2.0, 5.0 mg/L BAP dan 1.0, 2.0, 5.0 mg/L kinetin. Eksperimen ini dijalankan dengan menggunakan rekabentuk rawak sempurna (CRD) dengan 10 replikasi setiap rawatan dan 10 eksplan setiap replikasi. Pemerhatian menunjukkan bahawa medium yang mengandungi 1.0 mg/L kinetin mempunyai purata bilangan pucuk tertinggi (0.91) pada setiap eksplan selepas 5 minggu dikultur tetapi ia tidak ada perbezaan yang signifikan berbanding dengan rawatan kawalan dan rawatan BAP atau kinetin lain. Purata bilangan pucuk yang paling tinggi (0.92) selepas 3 minggu subkultur adalah pada medium 1.0 mg/L BAP tetapi juga menunjukkan tidak ada perbezaan yang signifikan berbanding dengan rawatan kawalan serta rawatan BAP dan kinetin lain kecuali 1.0 mg/L kinetin yang menunjukkan pengurangan yang signifikan ke atas purata bilangan pucuk yang terbentuk pada setiap eksplan.

1 INTRODUCTION

Brinjal (*Solanum melongena*) belongs to the Solanaceae family. It is an important solanaceous crop grown as vegetable. This plant is also known as aubergine, eggplant or Guinea squash in different countries. Brinjal probably originated from India but it is now widely cultivated throughout the tropical and subtropical regions. Sihachakr et al., (1993) stated that brinjal has significant economic importance in Asia, Africa, and the subtropics (India, Central America), but is also grown in some warm temperate regions (Mediterranean area, South of the USA). The top producer of brinjal in the world is China producing 27,700,100 metric tons, followed by India, Iran, Egypt and Turkey (FAO, 2011).

Brinjal is one of the non-tuberous species of the nightshade Solanaceae family. It can grow to a height of 1-1.5 m and the plant is normally grown as an annual. The plant has simple leaves and the flowers are single or are borne in cluster. The flower is white to purple, with a five-lobed corolla and yellow stamens. The plant bears fruits that are frequently use in cooking and also can be consumed either fresh, dried or pickled. Brinjal has various fruit shape such as round, ovoid or longish oblong. The colour of brinjal fruit varies from white to yellow, green, purple or dark purple. The fruit length depends on the fruit and the shape ranging between 4-45 cm long and with a thickness of 2-35 cm, and the weight ranging between 15-1500 g (Sękara et al., 2007).

Brinjal has higher calorie, iron, phosphorus, and riboflavin compared with tomato (Ray et al., 2011). According to Khan (1979) the fresh weight of this fruit is composed of 92.7% moisture, 1.4% protein, 1.3% fibre, 0.3% fat, 0.3% minerals, and 4% carbohydrates and vitamins (A and C). Brinjal has been widely used in traditional medicines. For example, tissue extracts of brinjal have been used for treatment of asthma, bronchitis, and cholera. The fruits and leaves of brinjal plant are beneficial in lowering blood cholesterol (Kashyap et al., 2003).

The cultivation of brinjal is mostly by seeds. Usually in the local market non hybrid seeds and hybrid seeds are sold. Hybrid seed has superior characteristic which produces good quality yield. Also, hybrid brinjals are more resistant to pest and disease, especially the fruit borer and wilt disease. However, in small scale farm non hybrid seeds are preferred because they are less expensive than the hybrid seeds.

There are several problems related with the production of F1 hybrid brinjal plant in Malaysia. The price of imported hybrid seeds is expensive. Furthermore, the production of hybrid seeds of brinjal in Malaysia is impossible due to no parent material available for hybridisation. An alternative for this is to micropropagate the F1 hybrid plant using somatic tissues such as using the shoot tip culture. Therefore, *in vitro* propagation is the best option to mass multiply the hybrid variety and maintaining true to typeness of the plant.

Previously, the regeneration of brinjal plants has been reported either directly from shoot tip (Ferdausi et al., 2009), stem, root and leaf (Ray et al., 2011), and hypocotyl and cotyledon (Bardhan et al., 2012). Since very limited report has been made on *in vitro* propagation of brinjal, therefore this experiment is conducted with the objective to determine the best BAP and kinetin concentrations in initiating shoot regeneration from shoot tip explants of F1 hybrid brinjal.

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