

UNIVERSITI PUTRA MALAYSIA

EFFECT OF DIFFERENT CONCENTRATIONS OF 6-BENZYLAMINOPURINE (BAP) ON GROWTH OF CENTELLA ASIATICA (L.) URBAN CUTTINGS

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CERTIFICATION

This project entitled "Effect of Different Concentrations of 6-Benzylaminopurine (BAP) on Growth of *Centella Asiatica* (L.) Urban Cuttings" is prepared by Siti Salwa Binti Yusof and submitted to the Faculty of Agriculture, Universiti Putra Malaysia in partial fulfilment of the requirement of PRT4999 (Project) for the award of degree of Bachelor of Agricultural Science.



Date:

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ABSTRACT

Centella asiatica (pegaga) is an important medicinal plant that has been claimed to possess various healing effect and antioxidant properties. For many years, a lot of commercial and medicinal researches have been carried out on this plant to meet the pharmaceutical demand. Therefore, this experiment was carried out to study the effect of different BAP concentration on the growth of C. asiatica cuttings. The experiment was carried out at the Cell Biology and Genetics Laboratory, Department of Agriculture Technology, Faculty of Agriculture, Universiti Putra Malaysia. The objective of this experiment was to determine the best concentration of BAP for optimizing the growth of Centella asiatica cuttings. The experiment was conducted using Randomized Complete Block Design (RCBD) with five treatments and six replications. The cuttings of *C. asiatica* were dipped into BAP solution (0.0, 0.5, 1.0, 5.0, 10.0 mg/L) for one hour. Then, they were planted in trays containing perlite. Each plant cutting was supplied with Murashige and Skoog (MS) solution at 20 mL every week. The experiment was carried out for duration of 6 weeks. The number of leaf per cutting, mean root volume, and length of root were recorded as the parameters. Data were analyzed using ANOVA and the means were compared using Tukey test. It was observed that there was no significant difference between all BAP treatments compared with control treatment on mean number of leaf and mean root volume. However, there was significant difference observed on the mean root length between BAP treatments at 5.0 mg/L and 10.0

mg/L.

ABSTRAK

Centella asiatica (pegaga) adalah satu tumbuhan ubatan penting yang telah dikenalpasti mempunyai pelbagai sifat penyembuhan dan kandungan antioksidan. Dalam beberapa tahun kebelakangan ini, banyak kajian perniagaan dan perubatan telah dijalankan ke atas tumbuhan ini untuk memenuhi permintaan dalam bidang farmaseutikal. Oleh itu, kajian ini telah dijalankan untuk mengkaji kesan perbezaan kandungan kepekatan larutan BAP terhadap pertumbuhan keratan pokok C. asiatica. Kajian ini telah dijalankan di Makmal Biologi Sel dan Genetik, Jabatan Teknologi Tumbuhan, Fakulti Pertanian, Universiti Putra Malaysia. Objektif kajian ini adalah untuk menentukan kandungan kepekatan larutan BAP yang terbaik untuk memaksimakan pertumbuhan keratan C. asiatica. Kajian ini telah dijalankan dengan menggunakan Rekabentuk Penuh Rawak Berblok (RCBD) dengan lima rawatan dan enam replikasi. Keratan Centella asiatica direndam ke dalam larutan BAP (0.0, 0.5, 1.0, 5.0, 10.0 mg/L) selama satu jam. Kemudian, ia ditanam di dalam dulang berisi perlite. Setiap keratan pokok disiram dengan larutan Murashige and Skoog (MS) sebanyak 20 mL pada setiap minggu. Kajian ini telah dijalankan dalam tempoh 6 minggu. Bilangan pucuk, isipadu akar, dan kepanjangan akar telah dicatatkan sebagai parameter. Data telah dianalisis mengunakan ANOVA dan cara bandingan menggunakan ujian Tukey. Keputusan menunjukkan bahawa terdapat perbezaan bererti di antara semua rawatan BAP dibandingkan dengan rawatan kawalan terhadap bilangan pucuk dan isipadu akar. Walaubagaimanapun, terdapat perbezaan bererti terhadap kepanjangan akar yang dapat dilihat di antara rawatan BAP 5.0 mg/L dan 10.0 mg/L.

CHAPTER 1

INTRODUCTION

Centella asiatica (L.) Urban, or locally known as pegaga, is a small creeping herb that belongs to the Apiaceae family. It originated from Asian and East African regions including India, Sri Lanka and Madagascar. Later, it spreads out to other countries such as Malaysia, Pakistan, China, Japan, East Africa, West Indies, South America and Australia (Loc *et al*, 2010). It is commonly found growing in wet areas near river banks and canals. The plant is known for its medicinal use since ancient times as it possesses various healing effect and antioxidant properties. It has been used as a support for faster healing of small wounds. In addition, it is also used for treatment of burns, itching and insect bites. In Malaysia, *C. asiatica* is use more as a traditional vegetable or an 'ulam' rather than a medicinal plant for herbal remedies.

C. asiatica has undergone many extensive and clinical experimental research. This medicinal herb has pharmacological value because of the presence of major triterpenes, collectively known as centellosides, which include asiaticoside, madecassoside, asiatic acid, and madecassic acid. The pharmacological value of *C. asiatica* are its antibacterial, fungicidal and cell proliferative activities which have been observed to aid in the treatment of wounds (Paramageetham *et al.* 2004), ulcers, various skin diseases, vein insufficiency, tuberculosis and in the treatment of mental disorders (Mathur *et al.* 2000). Export and Import Bank of India has reported that *C. asiatica* is one of the important medicinal plants in the international market of medicinal plant trade (Kameshwara Rao, 2000).

C. asiatica is highly demanded in the international market of medicinal plant trade (Naidu *et al.* 2010). The increasing demand of *C. asiatica* is met by collecting from the natural habitats. Because of limited cultivation and unrestricted exploitation on a large scale of this natural resource, the wild stock of *C. asiatica* has been decreasing and now listed as a threatened species by the International Union for Conservation of Nature and National Resources (IUCN) (Mercy *et al.*, 2012) and an endangered species (Paramageetham *et al.*, 2004). Therefore, there is a need to increase *C. asiatica* production and cultivation for maintaining and conserving this plant. At present, there is not much research carried out in understanding the requirement for growth and multiplication of this plant. The objective of this study is to determine the best concentration of BAP for optimizing growth and cultivation of *C. asiatica*.

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