UNIVERSITI PUTRA MALAYSIA

EFFECT OF DIFFERENT CONCENTRATIONS OF BAP AND KINETIN ON POLYEMBRYONY INDUCTION OF Mangifera indica L SEEDS

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CERTIFICATION FORM

This project paper entitled Effect of Different Concentrations of BAP and kinetin on polyembryony induction of *Mangifera indica L* seeds, prepared by Mohamad Nazrin bin Ahmad Azmi (155993) in partial fulfilment of requirement of PRT 4999 (Final Year Project) for the award of the Degree of Bachelor of Agricultural Science.

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
BAP	6-benzylaminopurine
mg/L	Milligram per liter
MS	Murashige and Skoog
ml	millilitre

ABSTRACT

An experiment was conducted to study the effect of different concentrations of BAP and Kinetin on polyembryony induction of mango seeds. The experiment was carried at the In-vitro Laboratory at the Department of Agriculture Technology, Faculty of Agriculture UPM. Nine treatments were used which are 0 (the control treatment), 2, 4, 6 and 8 mg/L of BAP and kinetin respectively. Experimental design for this experiment was randomized complete block design (RCBD) with 9 treatments and 10 replications for each treatment. Seeds obtained were soaked in BAP and kinetin solution at different concentration for 1 hour and 30 minutes before sown into the perlite media. Data collection were made after 8 weeks based on the percentage of seeds inducing polyembryony per treatment and mean no of seedlings emerged per seed per treatment. It was observed that 6 mg/L BAP resulted in the highest percentage of seeds inducing polyembryony. However there is no significant difference between the range of concentration of BAP and Kinetin tested compared with the control treatment in enhancing shoot induction per seeds of mango.

ABSTRAK

Satu eksperimen telah dijalankan untuk mengkaji kesan kepekatan BAP dan Kinetin yang berbeza terhadap induksi poliembryoni pada biji mangga. Kajian telah dilaksanakan di Makmal In- vitro, Jabatan Teknologi Pertanian, Fakulti Pertanian UPM. Sembilan rawatan telah digunakan iaitu 0 (rawatan kawalan), 2, 4, 6 dan 8 mg /L BAP dan kinetin. Reka bentuk eksperimen ialah reka bentuk blok lengkap rawak (RCBD) dengan 9 rawatan dan 10 replikasi untuk setiap rawatan. Benih yang diperolehi direndam di dalam larutan BAP dan kinetin pada kepekatan yang berbeza untuk 1 jam dan 30 minit sebelum disemai ke dalam media perlit. Pengumpulan data dibuat selepas 8 minggu berdasarkan peratusan benih yang mendorong poliembryoni setiap rawatan dan bilangan pucuk terhasil bagi setiap biji benih bagi setiap rawatan. Berdasarkan pemerhatian, 6 mg / L BAP menunjukkan bilangan peratusan biji benih yang tertinggi dalam menghasilkan gandaan pucuk daripada satu biji benih. Analisis varians menunjukkan bahawa tidak terdapat perbezaan yang signifikan julat kepekatan BAP dan Kinetin yang diuji berbanding dengan rawatan kawalan terhadap purata bilangan pucuk terbentuk per biji benih mangga.

CHAPTER 1

INTRODUCTION

Mango (*Mangifera indica L*) or 'mangga' is a seasonal fruit belonging to the genus *Mangifera* of the family Anacardiaceae. It originated from India and Myanmar (Bally, 2006).

There are many uses of mango such as for making juice, flavor, fragrance, colour and common ingredient in new functional foods. Its leaf can be used as floral decoration in wedding and religious ceremonies (Fowomola, 2010). According to Kittiphoom (2012), mango seed can be utilized since it contains nutrients such as starch, fat and protein. Meanwhile, the kernels can be extracted to obtain phytochemical compounds such as polyphenols, phytosterols, sitosterols and tocopherols. Litz (2009) mentioned that the peels (skin) can be used as a source of anacardic acid, and the bark is an important source of tannins for curing leather.

Because of that, it has become a major fruit crop of the tropics and subtropics, particularly in Asia. It has become the most important fruit crop which leads to be known as 'king of fruits' in India (Purseglove, 1972). India, East Africa, Sri Lanka, Brazil, Mexico and few other South-east Asia countries such as Philippines, Thailand and Indonesia are the main exporters of mango. Unlike other countries, Malaysia is unable to become the main exporter of mango due to the low production of mango (Jabatan Pertanian, 2009). Jabatan Pertanian (2009) also reported that the cultivation areas of mango in Malaysia are more than 8000 ha approximately. Cultivation of mango can be found in Kedah, Perak, Perlis and Malacca, and most of it is managed by the small farmers (1-5 ha).

According to the Jabatan Perangkaan Malaysia (2012), self-sufficiency ratio of mango production in Malaysia from 2006 to 2010 decreased from 60.6% to 41.3%. Based on this statistic, it shows that the production of mango is critically low unlike the other fruits. Because of that, Malaysia import mangoes from other countries such as Thailand, Philipines, India, Pakistan and Australia. Therefore, it is best and important for Malaysia to cultivate mango, and become one of the mango exporter to fulfill the demand for this fruit.

There are two methods to cultivate mango which are through sexual (from seed) or asexual (vegetative propagation) means. Vegetative propagation method is used to obtain trueness to type plant (clone). Through this method, the new plant produced will have identical characteristics as the mother plant. Meanwhile, plants from seeds will have different characteristics from the mother plant (off type).

New plant that is grown from mango seed is not normally used for human consumption or to be commercialized. It is grown for the rootstock production (Smith et al, 2003). Smith et al (2003) added that rootstocks are important as it can ensure propagation of desired cultivar (grafting, budding, etc) can be done. The good and quality rootstocks can enhance and affect the performance of the scions. Therefore, it is best to obtain good quality rootstocks for the scion in order to produce high quality mango. However, to obtain mass number of the quality and desired characteristics of rootstocks seems impossible. It is because mango fruit is seasonal, affected easily by soil-borne disease at seedling stage and etc.

However, with polyembryonic mango, it is possible to obtain a large number of rootstocks at a time. Polyembryonic mango can produce multiple seedlings from one seed. According to Bally (2006), polyembryonic seeds will usually produce 3 to 10 seedlings from each seed. Seedlings produced from polyembryonic seed consist of one zygotic (non true to type) and others are of nucellar origin (true to type). Those plants originated from the

nucellars can be exploited for rootstock production, but the emergences of nucellar seedlings from seeds are rare under normal condition.

At present especially in Malaysia, polyembryonic mango only produce 1-2 seedlings only per seed. For production of quality rootstocks, more seedlings should be produced from each seed (especially those of nucellar origin). The main problem is what kind of treatment can trigger the production of nucellar seedlings from a polyembryonic seed?

Objective :

To determine the effect of different concentration of BAP and Kinetin on induction of polyembryony in *Mangifera indica L* seeds.

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