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IN VITRO MICROPROPAGATION OF *Musa acuminata* cv. BERANGAN (AAA) USING NEW FORMULATION OF BIOORGANIC MEDIA

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ABSTRACT

Plant tissue culture provides effective production for banana's high demand supply as one of subsistence crop and commercialized product. Commonly used plant tissue culture media such as Murashige and Skoog (MS), Gamborg's (B_5) and Schenk and Hilderbrandt (SH) medium are known for their high mineral content and competent in promoting plant tissue culture. However, these media are costly, containing synthetic component and non-locally available. Therefore, this study has been conducted to develop an alternative plant tissue culture medium with high nutrient component. Fruits peel that have been formulated to develop media by using a fermentation process consisting of formula A (calamansi, key and kaffir lime peel), formula B (banana, papaya and pineapple peel), formula C (kaffir lime, apple mango and guava peel) and formula D (Banana, dragonfruit and honey mango peel) were prepared in different concentrations to study the effects of *in vitro* micropropagation of *M.acuminata*. The plantlets were cultured onto bioorganic media and incubated in culture room for six weeks. Number of shoots and height of the shoot were recorded. The highest number of shoot and root obtained in control media with 2.50± 0.56 and 3.17± 0.60 respectively while the highest plant height and number of leaves recorded in formula D with 2.78± 0.32cm and 2.83± 0.17 respectively. Contamination rate data showed the lowest in formula D with no contamination recorded. From this study, the application of bioorganic media is not significantly different ($p \geq 0.05$) in promoting *M.acuminata* growth but significantly difference ($p < 0.05$) in reducing contamination rate in *M.acuminata*. All bioorganic media formulas showed positive response in shoots regeneration. Therefore, this bioorganic media should be considered as the alternative culture media of *M.acuminata* as it showed positive response in promoting explants growth and it has low production cost as it is made up of organic waste and locally available.

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CHAPTER ONE
INTRODUCTION

1.1 Background of Study

Banana, a member of Musaceae family is one of the most important crop. Banana has been reported to rank as second most important crop with 22% of world's fresh fruit production (Pua, 2007; Jafari et al., 2011). For millions of communities in humid and subhumid tropics area, banana regarded as major staple food crop (Chikezie, 2012). Therefore, it is also counted as socio-politically important in developing world (Pua, 2007). It had been placed fourth as important diets crops for people especially in South East Asian. Malaysia is one of the origin country of banana and plaintain with about 50 types expected in exportation business. However, in exportation aims, the quality needs to be further improved (Darvari et al., 2010).

As a crop that is important in commercialization aspect, banana needs continuous and constant production in achieving stable supplies (Jafari et al., 2011). However, traditional agriculture that uses conventional method is incapable to solve this high demand issue. The conventional propagation of banana were done by using the suckers. The process has various limitations either in its method and output. Conventional method consumes a long time for effective production of banana to take places (Darvari et al., 2010). While the limitations regarding the output include low propagation rates and highly disaggregating. Besides, the spreading of pest and pathogen had also further complicating this method (Vuylsteke and Ortiz, 1996; Makara et al., 2010). To conclude, time, instability and disease threat had been proven as this method disadvantages which made this method was not the best possible solution in the current issue. Threatening current production of banana which had been regarded as a highly important food source may then affecting the exports market trade balance (Becker et al., 2000).

To overcome those problems, application of advance biotechnology has been seen as the ideal solution instead of using conventional method (Altman and Hasegawa, 2012). The advanced biotechnology involved is clonal planting material which used tissue culture propagation techniques. It is necessary for continuous of good quality banana production (Jafari et al., 2011). This plant tissue culture technique had been