

DIRECT AND INDIRECT PLANT REGENERATIONS OF PINEAPPLE VAR. MD2 (*Ananas comosus* L.)

HAMID, N.S.¹, BUKHORI, M.F.M.² and JALIL, M.^{1,3*}

¹Centre for Foundation Studies in Science, University of Malaya,
50603 Kuala Lumpur, Malaysia.

²Centre for Pre-University Studies, Universiti Malaysia Sarawak,
94300 Kota Samarahan, Sarawak, Malaysia.

³Plant Biotechnology Incubator Unit (PBIU),
Centre for Research in Biotechnology for Agriculture (CEBAR),
University of Malaya, 50603 Kuala Lumpur, Malaysia

*E-mail: hanom@um.edu.my

ABSTRACT

The variety MD2 of pineapple (*Ananas comosus* L.) was used in this study. This variety is highly demanded in the international market and known for possessing harvest quality with aroma, high sugar content (14% Brix), vitamins and longer shelf life. However, shortage of planting material has limited the production in Malaysia. *In vitro* mass propagation using the direct and indirect shoot proliferation techniques was tested on variety MD2. The plantlets were successfully initiated from sucker on solid MS basal medium containing 30 g/L sucrose, 0.1 g/L Myo-inositol and 3 mg/L BAP after one month of culture. The highest direct shoot tips regeneration was obtained on solid MS medium when added with 30 g/L sucrose, 0.1 g/L Myo-inositol, 3 mg/L BAP and 1 mg/L NAA. Indirect shoot regeneration was obtained on medium containing 3 mg/L Zeatin after one month of culture. In average, 10 shoots were regenerated from approximately 1 gram of calli. The techniques can produce 100-200 number of plantlet within 4 to 6 months of culture, and ready for planting after 7 months of culture.

Key words: Direct micropropagation, indirect micropropagation, pineapple, MD2, plant regeneration

INTRODUCTION

Pineapple is listed as a major tropical fruit in world production (FAOSTAT, 2010). One of the highly successfully commercialized pineapple varieties is MD2 variety because it is traded in about 75% of the European Union market (Anonymous, 2006). MD2 is a hybrid pineapple produced by Pineapple Research Institute (PRI), Hawaii and currently being the most demanded variety compared to Smooth Cayenne variety (Danso *et al.*, 2008). In fact, MD2 is a very demanding tropical fruit in both domestic and export for international markets (Davey *et al.*, 2007). In Malaysia, MD2 have been listed as one of the seven tropical fruits in focusing the output production via the National Key Economic Area (NKEA) initiative under the Malaysian Permanent Food Production Areas (LPNM, 2012). The variety is in high demand due to its sweets aroma, blemish-free flesh and deep golden fruit with high sugar content (14% Brix) with vitamin A, B, and C, ripen

evenly and longer shelf life (Danso *et al.*, 2008 & Akbar, 2003). There is an increase in the planting areas and the demand for planting materials. Among the problems faced by pineapple industry in Malaysia is shortage of MD2 planting material because MD2 needs a long period of time to produce slips/suckers. As a result, the slips/suckers are expensive and this will burden the farmers with the increase of capital. This problem could be overcome by producing large number of plantlets through tissue culture techniques. The study of MD2 pineapple had been done by Danso *et al.*, 2008 through direct *in vitro* micropropagation. Indirect regeneration was done since plantlet production can be scaled up manifold through the intervening callus phase, compared to direct regeneration (ShaValli Khan *et al.*, 2002).

Indirect regeneration through callus culture has been proven to be more efficient in plantlet production as compared to organogenesis (Akbar *et al.*, 2003 & Khan *et al.*, 2002). The culture will undergo the formation of morphogenic callus and somatic embryo prior preceded to organogenesis.

* To whom correspondence should be addressed.