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A Newly Developed Method for Rapid Propagation of an Important Culinary and Medicinal Herb (*Etlingera elatior*)

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As being a vital ingredient of many drugs and medicines, herbal plants have gained much importance in the field of human medication (Bedi and Shenefelt, 2002). *Etlingera elatior* also known as Torch ginger is herbal and medicinal plant; it is native to Malaysia but also under wide cultivation in Southeast Asia (Chan *et al*., 2011). It is also used as condiment and ornament; it has many essential phytochemicals of antimicrobial, antioxidant and cytotoxic properties. It has amplified antioxidant property than many other ginger varieties and to facilitate its medicinal use researchers are trying to estimate the highest essential oil producing techniques (Chan *et al*., 2008, 2009; Abdelmageed *et al*., 2011a). But one major problem with this species is its propagation through slow growing rhizome. This may makes its rhizome susceptible to rhizome rots caused by soil pathogens (Lins and Coelho, 2004), but the hope to promote its pathogen free propagation is Tissue Culture (TC) technique. In these technique explants are used to develop multiple *in vitro* shoots by adding different development fasting nutrients (Chan and Thong, 2004; Mendez *et al*., 2004). These nutrients can be plant growth hormones e.g., cytokinin etc., which upon addition in TC medium stimulate the growth of new plants (Salvi *et al*., 2002). The efficiency of *in vitro* technique is measureable via examining the different growth parameters e.g. shoot-root length, number and the survival rate of acclimatized plants (Faridah *et al*., 2011). Thus to get large number of medicinal products from plants, there should be enough plant biomass and the role of propagation techniques should be critically investigated.

Abdelmageed *et al*. (2011b) conducted a research to determine the effectiveness of different hormonal concentrations in tissue culture micropropagation of *E. elatior*. For this purpose the axillary buds of *E. elatior* rhizome are grown in Murashige and Skoog (MS) medium having various concentration of cytokinin (BAP) and auxin (IAA). Their results indicate MS as an efficient medium for TC while BAP as shoot promoting and IAA as root promoting factor. They observe that BAP stimulate the shoot growth at all concentrations but significant increase in shoot number (3.67/explant) per explant was observed at 22.2 μM concentration. It significantly increases shoot length at 26.6 μM concentration which was 4.20 cm, while maximum leaves per shoot were noted for both (22.2 and 26.6 μM) concentration. On the other hand, IAA promotes the root number significantly at 11.4 μM with 3/explant roots and largest root length was observed at 34.2 μM (4 cm). IAA at higher concentrations inhibits the growth in root numbers but promotes the growth of roots length, while BAP impose random effects on shoot number and always have positive effects on its length. All these plants were healthy and their survival rate was 75% when acclimatized in new environment. They also found that both these hormones in combination, when used at correct concentrations, show positive growth effects. As Colombo *et al*. (2010) reported in his experiment that both hormones in a combination of BAP 4.95 mg L^{-1} + IAA 0.87 mg L^{-1} concentration promote the shoot growth in MS medium. Similarly the use of MS medium, BAP and IAA growth stimulating hormones for rapid and micropropagation techniques is promoted by many researchers (Anish *et al*., 2008; Bejoy *et al*., 2006; Jagadev *et al*., 2008). Thus TC technique provides advantage to slow growing plants, as it give rapidly growing plantlets of them. It let the addition of growth promoting factors in media depending upon the growers desire i.e. shoot promoting, root promoting or both factors.

In the end this can be said that as medicinal plants are an important part of human life, there should be plant protecting and growth promoting application like tissue culture. Because it helps in getting large number of plants only from small explants, as it has the potential to involve growth promoting compounds. Abdelmageed *et al*. (2011b) in his experimental study on TC, find out the positive effects of growth hormones on a significant medicinal plant *E. elatior*. These hormones increase the number and length of its shoots-roots in concentration dependant manner and provide morphologically normal plants, which can be acclimatized in new environment. Thus TC technique is highly efficient in promoting the slow growing medicinal plants' and future research is needed to reduce the cost of plant production by using this technique.

REFERENCES

Abdelmageed, A.H.A., Q.Z. Faridah, A. Nur Amalina and M. Yaacob, 2011a. The influence of organ and post-harvest drying period on yield and chemical composition of the essential oils of *Etlingera elatior* (Zingiberaceae). J. Med. Plants Res., 5: 3432-3439.

Abdelmageed, A.H.A., Q.Z. Faridah, F.M.A. Norhana, A.A. Julia and M. Abdul-Kadir, 2011b. Micropropagation of *Etlingera elatior* (Zingiberaceae) by using axillary bud explants. J. Med. Plants Res., 5: 4465-4469.

Anish, N.P., M. Dan and M. Bejoy, 2008. Conservation using *in vitro* progenies of the threatened ginger-*Boesenbergia pulcherrima* (Wall.) kuntze. Int. J. Bot., 4: 93-98.

Bedi, M.K. and P.D. Shenefelt, 2002. Herbal therapy in dermatology. Arch. Dermatol., 138: 232-242.

Bejoy, M., M. Dan and N.P. Anish, 2006. Factors affecting the *in vitro* multiplication of the endemic zingiber-Curcuma haritha Mangaly and Sabu. Asian J. Plant Sci., 5: 847-853.

Chan, L.K. and W.H. Thong, 2004. *In vitro* propagation of *Zingiberaceae* species with medicinal properties. J. Plant Biotechnol., 6: 181-188.

Chan, E.W.C., Y.Y. Lim, L.F. Wong, F.S. Lianto and S.K. Wong *et al.*, 2008. Antioxidant and tyrosinase inhibition properties of leaves and rhizomes of ginger species. Food Chem., 109: 477-483.

Chan, E.W.C., Y.Y. Lim, S.K. Wong, K.K. Lim, S.P. Tan, F.S. Lianto and M.Y. Yong, 2009. Effects of different drying methods on the antioxidant properties of leaves and tea of ginger species. Food Chem., 113: 166-172.

Chan, E.W.C., Y.Y. Lim and S.K. Wong, 2011. Phytochemistry and pharmacological properties of *Etlingera elatior*: A review. Pharmacogn. J., 3: 6-10.

Colombo, L.A., A.M. de Asis, R.T. de Faria and S.F. Roberto, 2010. Establishing a protocol for *in vitro* multiplication of Philippine was flower (*Etlingera elatior*) Jack RM Sm. Acta Sci. Agron., 32: 695-700.

Faridah, Q.Z., A.H.A. Abdelmageed, A.A. Julia and R.N. Hafizah, 2011. Efficient *in vitro* regeneration of *Zingiber zerumbet* Smith (a valuable medicinal plant) plantlets from rhizome bud explants. Afr. J. Biotechnol., 1002: 9303-9308.

Jagadev, P.N., K.N. Panda and S. Beura, 2008. A fast protocol for *in vitro* propagation of ginger (*Zingiber officinale* Rosc.) of a tribal district of India. Acta Hortic., 765: 101-108.

Lins, S.R.O. and R.S.B. Coelho, 2004. Occurrence of diseases in ornamental tropical flowers in the State of Pernambuco. Fitopatol. Bras., 29: 332-335.

Mendez, A.M.V., J.G.A. Moctezuma and J.L.R. Lao, 2004. Propagation of torch ginger (Nicolaia elatior (Jack.) Horan) through *in vitro* shoot tip culture. Propag. Ornam. Plants, 4: 53-59.

Salvi, N., L. Grorge and S. Eapen, 2002. Micropropagation and field evaluation of micropropagated plants of turmeric. Plant Cell Tiss. Org. Cult., 68: 143-151.