Journal of Plant Biology, March 2005, 48(1) : 142-146 **SHORT COMMUNICATION**

Effect of Plant Growth Regulators on Regeneration of Plantlets from Bud Cultures of *Cymbopogon nardus* L. and the Detection of Essential Oils from the *in Vitro* Plantlets

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***Cymbopogon nardus* L. could be propagated via tissue culture using axillary buds as explants. The aseptic bud explants obtained using double sterilization methods produced stunted abnormal multiple shoots when they were cultured on Murashige and Skoog medium (MS) supplemented with 1.0 mg L^{-1} or 2.0 mg L^{-1} benzyladenine (BA). Stunted shoots that cultured on MS + 1.0 mg L^{-1} BA + 1.0 mg L^{-1} N^6-isopentenyl-adenine (2iP) could induce elongation of shoots from about 60% of the stunted shoots. Normal multiple shoots could be induced at the highest (19.7 shoots per bud) from the bud explants within six weeks when cultured on proliferation medium consisted of MS supplemented with 0.3 mg L^{-1} BA and 0.1 mg L^{-1} indole-3-butyric acid (IBA). The separated individual shoot produced roots when transferred to basic MS solid medium. The essential oils that were contained in the mature plants namely citronellal, geraniol and citronellol were also found in the *in vitro C. nardus* plantlets. Citronellal was the main essential oil component in the matured plants while geraniol was the main component in the *in vitro* plantlets.**

Keywords: axillary buds, benzyladenine, *Cymbopogon nardus*, essential oils, indole-3-butyric acid, multiple shoots

Cymbopogan nardus L. is an aromatic grass belonging to *Gramineae* family. It is commonly known as serai wangi in Malaysia and Indonesia. This plant is believed to be originated from Sri Lanka and South India. It has been grown commercially on a large scale in Haiti, Central America, the South Pacific, and tropical Africa. It grows very well in moist alluvium soil and its growth becomes retarded during the dry season (Henderson, 1954). It produces clumped bulbous stems that become leaf blades and branched clusters of stalked flowers when flowering.

C. nardus has long been used in Malaysia as traditional medicine. It contains three main essential oils, citronellal, citronellol and geraniol, which can be used for relieving stomach discomfort, aiding digestion and as antispasmodic agent (Burkill, 1966). The plant was also found to be effective in the treatment of skin aczema, giddiness, and abdominal colic. It has antiseptic properties and also has been used as insect repellant (Ghani et al., 1991). In Europe, the essential oils of the plant have been distilled and used for making perfume, soap, and cosmetics (Ketaran, 1988). It is also found to be effective against *Anopheles stephesi* larvae, a carrier of malaria fever (Kumar and Dutta, 1987).

C. nardus is conventionally propagated by dividing into small clumps and planted in the soil. But this process often results in fungal diseases that can influence the quality of essential oil within the plants (Ketaran, 1988). In view of their medicinal values and the problems of fungal diseases in the field, *in vitro* culture technique can be an attractive alternative for mass production of the plant. Objectives of this study are to establish a tissue culture method for propagating *C. nardus* and to analyze the essential oils in the *in vitro* plantlets.

MATERIALS AND METHODS

Plant Material

The mature field grown *C. nardus* plants were obtained from Relau Agriculture Station, Penang, Malaysia. Buds at the bulbous stem were cut, washed with detergent, and rinsed with running tap water for 30 min. The explants were then surface-sterilized

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