

Tissue Culture and Essential Oil Production From Callus Cultures of Ilang-ilang [*Cananga odorata* (Lamk) Hook.f. & Thomson]

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In vitro culture of ilang-ilang [*Cananga odorata* (Lamk) Hook.f. & Thomson] was done to determine the responses of the different explants (shoot tip, node, young leaf, ovary and petal) to Woody Plant Medium (WPM) and Murashige and Skoog's (MS) culture medium formulations and investigate the extent of essential oil production in petal-derived calli.

The ovary callus showed profuse growth and highest fresh weight increments over the other calli types when cultured on WPM. Induction of shoot buds from shoot tip, node and leaf calli that have gone through 15–16 wk of subculture was greatly enhanced by MS medium supplemented with 0.2 mg L⁻¹ naphthaleneacetic acid (NAA) + 2 mg L⁻¹ benzylaminopurine (BAP). However, the subsequent development of these buds into elongated shoots was obtained only on WPM fortified with 2 mg L⁻¹ BAP. Percent shoot formation and the number of new shoots were also significantly higher on WPM than on MS medium. Regenerated shoots from established cultures of shoot tip, leaf and node were successfully rooted on half-strength WPM with 0.5 mg L⁻¹ indole-3-butyric acid (IBA).

Gas chromatography analyses of essential oils extracted from fresh flowers confirmed the presence of four major oil components such as linalool (18.3%), benzyl acetate (4.4%), geraniol (1.4%) and β -caryophyllene (2.8%). In contrast, only linalool and benzyl acetate were detected from petal callus extract. Both components differed in concentration depending on medium composition and illumination condition; linalool was greater in light-grown calli relative to dark-grown, while benzyl acetate was higher in cultures maintained under dark condition. Moreover, linalool concentration in fresh flower extract was higher compared with that of the callus while benzyl acetate was greater in callus than in fresh flowers. Results showed that *in vitro* culture could be an alternative tool for the propagation of ilang-ilang. Likewise, the petal-derived calli could be a good experimental system for further researches on essential oil production *in vitro*.

Key Words: callus induction, *Cananga odorata*, essential oil, ilang-ilang, *in vitro* culture, multiple shoots, plantlet regeneration, volatile components

Abbreviations: BAP – 6-benzylaminopurine, GC – gas chromatography, IBA – indole-3-butyric acid, MS medium – Murashige and Skoog's medium, NAA – α -naphthaleneacetic acid, WPM – Woody Plant Medium

INTRODUCTION

Although ilang-ilang [*Cananga odorata* (Lamk) Hook.f. & Thomson] has been traditionally grown as a forest tree, nowadays, it is also being planted as a shade tree along roadsides, around buildings and in vast lawns and gardens. The recent popularity of ilang-ilang as an ornamental crop stems largely from the fact that the plant bears fragrant flowers as early as 2 yr from planting and contin-

ues to do so as it grows into a full grown tree, thus exuding an exceptionally delicate scent in the area where it is planted. The flowers of ilang-ilang are also commonly used as pendants in sampaguita leis or are strung together to make adornments at festivities.

The scent of ilang-ilang flowers comes from its essential oil, which is said to be one of the finest essential oils in the perfume industry (e.g., as the signature scent of Chanel No. 5®) (<http://www.basenotes.net/ID10210628.html>).