UNIVERSITI TEKNOLOGI MARA

DETERMINATION OF MAJOR FRAGRANCE COMPOUNDS AND DEVELOPMENT OF CELL CULTURES OF *Citrus grandis* (OSBECK.) FLOWERS

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Thesis submitted in the fulfillment of the requirements for the degree of Master of Science

Faculty of Applied Sciences

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Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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ABSTRACT

Citrus grandis flowers possesses a strong floral-, jasmine- and orange- like aroma that has a potential in perfumery industries. Three extraction techniques that is hydrodistillation, Soxhlet extraction and solid phase micro extraction (SPME) were coupling with gas chromatograph–mass spectrometry (GC-MS) for analysis of fragrance compounds from this flowers. About 120 compounds were detected in bud and blossom of these flowers, of which the five major fragrance compounds were β-myrcene, limonene, ocimene, linalool and caryophyllene. In hydrodistillation, ocimene and linalool detected in blossom were higher than in bud with 4.57%. However, Soxhlet extraction showed that bud contained high percent of limonene (27.25%), ocimene (5.55%) and linalool (2.97%) compared to blossom. Three different SPME fibers were used in this study, namely, 65 μm CAR/PDMS, 75 μm PDMS/DVB and 100 μm PDMS. The best result was obtained by 100 μm PDMS, that were then further analyzed for optimum sampling time. It showed 60 min fiber exposition time was the optimum sampling time to extract the major fragrance compounds from the headspace. In cell culture development, callus was successfully induced from different part of *C. grandis* flowers like petal, sepal, style, ovary, pistil and cup base on Murashige and Skoog (MS) medium supplemented with sucrose (30 g/l) and various concentrations of hormones. It was found that different parts of flowers required different level of hormone for callus induction. The highest formation of callus were obtained from petal and sepal cultured on MS media supplemented with 1.5 mg/l kinetin. For the style and pistil, 50% of the explants had developed callus when cultured on MS media added with 0.05 mg/l and 0.10 mg/l BAP respectively. On the other hand, sucrose agar media alone managed to induce callus formation from the cup base and ovary with success rate between 11 ± 1.29 to 25 ± 4.19%. Callus obtained were then subjected to SPME for determination of compounds in the callus. Seven compounds were detected in the callus which some of the compounds shows the same compounds as detected in the fresh flowers.

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