

Budi Utomo, 2015, Pengaruh Kombinasi Zat Pengatur Tumbuh *Naphthalene Acetic Acid* (NAA) dan Kinetin terhadap Pertumbuhan dan Kandungan Metabolit Sekunder Kalus Sirih Merah (*Piper crocatum* Ruiz dan Pav.). Skripsi ini dibawah bimbingan Dr. Junairiah, S.Si. M.Kes. dan Dr. Y. Sri Wulan Manuhara, M.Si, Departemen Biologi Fakultas Sains dan Teknologi Universitas Airlangga, Surabaya.

ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh kombinasi zat pengatur tumbuh *Naphthalene Acetic Acid* (NAA) dan kinetin pada media *Murashige dan Skoog* (MS) yang paling baik untuk pertumbuhan dan kandungan metabolit sekunder kalus sirih merah (*Piper crocatum* Ruiz dan Pav.). Eksplan dari daun *P. crocatum* ditumbuhkan pada media MS yang diperkaya dengan zat pengatur tumbuh NAA (2; 3; dan 4) ppm dan kinetin (0,5 dan 1) ppm. Setelah hasil kultur diperoleh, dilanjutkan dengan analisis kandungan senyawa menggunakan *Gas Chromatography-Mass Spectroscopy* (GC-MS). Hasil yang diperoleh menunjukkan bahwa pada perlakuan N4K0,5 mampu menginduksi kalus lebih cepat dari perlakuan yang lain dengan rerata waktu induksi kalus $22,40 \pm 2,90$ hari. Pada perlakuan N2K0,5; N2K1; dan N4K1 yang menghasilkan induksi kalus 100%. Pertumbuhan morfologi kalus sirih merah terbaik terdapat pada perlakuan N2K1 dengan visualisasi, kalus tumbuh pada tepi eksplan, kalus berwarna hitam, struktur kalus kompak. Pemberian perlakuan N2K1 dapat memacu rerata berat basah dan berat kering kalus paling optimal yaitu $0,5293 \pm 0,1910$ g dan $0,0521 \pm 0,0115$ g. 3 komponen senyawa dengan luas area tertinggi dari masing-masing perlakuan telah terdeteksi dalam hasil analisis GC-MS. NAA 2 ppm + kinetin 0,5 ppm: [*1,2-Benzisothiazole*, *1,2-Epoxy-1-vinylcyclododecene*, dan *Neophytadiene*], NAA 3 ppm + kinetin 0,5 ppm: [*Hexadecanoic acid*, *3-(3'-butenyl)cyclohexanone*, *Dimethylamphetamine*], NAA 4 ppm + kinetin 0,5 ppm: [*Hexadecanoic acid*, *Dimethylamphetamine*, dan *3-(dimethylamino)*], NAA 2 ppm + kinetin 1 ppm: [*n-Hexadecanoic acid*, *1-Octadecene*, dan *Dodecanoic acid*], NAA 3 ppm + kinetin 1 ppm: [*1,2-Benzisothiazole*, *1-Nonadecene*, dan (*1RS,4RS,5RS,6RS*)-*5,6-exo-epoxy*], NAA 4 ppm + kinetin 1 ppm: [*Hexadecanoic acid*, *7-Hydroxy-3-(1,1-dimethylprop-2, (cis)-2-nonadecene*].

Kata kunci: Naphthalene Acetic Acid, kinetin, metabolit sekunder, Piper crocatum Ruiz dan Pav, Gas Chromatography-Mass Spectroscopy.

Budi Utomo, 2015, The Effect of plant growth regulators Combination Naphthalene Acetic Acid (NAA) and Kinetin on the Growth and the Secondary Metabolite Content of Callus of the Red Betel (*Piper crocatum* Ruiz and Pav.). This thesis under the guidance of Dr. Junairiah, S.Si. Kes. and Dr. Y. Sri Wulan Manuhara, M.Si, Department of Biology, Faculty of Science and Technology, Airlangga University, Surabaya.

ABSTRACT

*The objectives of this study were to determine the best combination of plant growth regulators Naphthalene Acetic Acid (NAA) and kinetin on Murashige and Skoog (MS) effect for the growth and secondary metabolite content of callus of the red betel (*Piper crocatum* Ruiz and Pav.). The research was done by preparing explants from the leaves of *P. crocatum* grown on MS medium enriched by plant growth regulators NAA (2; 3; and 4) ppm and kinetin (0.5 and 1) ppm. After the culture were obtained, the compounds of the culture were analysed using Gas Chromatography-Mass Spectroscopy (GC-MS). The results showed that the treatment was able to induce callus N4K0,5 faster than other treatments with a mean time of 22.40 ± 2.90 callus induction day. The N2K0,5 treatment; N2K1; and N4K1 produce 100% callus induction. The best Growth morphology result of red betel callus were observed on N2K1 treatment with visualization, callus growing on the edge of explant, black callus, compact callus structure. The induction of N2K1 treatment can boost the average of wet and the dry weight of callus (0.5293 ± 0.1910 g and 0.0521 ± 0.0115 g). The 3 components of compounds with the highest area of each treatment has been detected in the GC-MS analysis. NAA 2 ppm + kinetin 0,5 ppm: [1,2-Benzisothiazole, 1,2-Epoxy-1-vinylcyclododecene, dan Neophytadiene], NAA 3 ppm + kinetin 0,5 ppm: [Hexadecanoic acid, 3-(3'-butenyl)cyclohexanone, Dimethylamphetamine], NAA 4 ppm + kinetin 0,5 ppm: [Hexadecanoic acid, Dimethylamphetamine, dan 3-(dimethylamino)], NAA 2 ppm + kinetin 1 ppm: [n-Hexadecanoic acid, 1-Octadecene, dan Dodecanoic acid], NAA 3 ppm + kinetin 1 ppm: [1,2-Benzisothiazole, 1-Nonadecene, dan (1RS,4RS,5RS,6RS)-5,6-exo-epoxy], NAA 4 ppm + kinetin 1 ppm: [Hexadecanoic acid, 7-Hydroxy-3-(1,1-dimethylprop-2, (cis)-2-nonadecene].*

*Keywords: Naphthalene Acetic Acid, kinetin, secondary metabolite, *Piper crocatum* Ruiz dan Pav, Gas Chromatography-Mass Spectroscopy.*