

## INTISARI

Jeruk purut (*Citrus hystrix* DC.) memiliki kandungan senyawa bioaktif yang berpotensi sebagai obat herbal. Kandungan senyawa bioaktif antar tanaman jeruk purut tersebut dipengaruhi oleh faktor eksternal, sehingga diperlukan teknik kultur *in vitro* yang menyediakan kondisi lebih terkontrol. Induksi kalus merupakan salah satu teknik kultur *in vitro* yang bisa digunakan dalam mempelajari metabolisme seperti produksi metabolit sekunder. Penelitian ini bertujuan untuk mengetahui induksi kalus biji jeruk purut dalam medium MS dengan kombinasi ZPT 2,4D (2,4-diclorophenoxy acetic acid) dan BAP (*Benzyl amino purine*), menentukan kurva pertumbuhan, dan profil senyawa bioaktif. Kalus diinduksidari eksplan embrio biji dalam medium MS dengan 3 kombinasi ZPT 2,4D:BAP, yaitu 1:0,5 ;1:1; dan 2:1. Parameter yang diamati adalah waktu inisiasi kalus, persentase pembentukan kalus, biomassa kalus, dan morfologi kalus. Kurva pertumbuhan kalus diperoleh dari biomassa kalus yang diukur setiap 5 hari sekali dalam waktu pengamatan 70 hari. Untuk menentukan profil boaktif kalus digunakan ekstrak kloroform dan etil asetat kalus umur 40 hari dan 60 hari dianalisis dengan GC-MS (*Gas Chromatography-Mass Spectrometry*). Hasil penelitian menunjukkan bahwa ketiga kombinasi ZPT 2,4D dan BAP mampu menginduksi kalus dari eksplan biji jeruk purut menghasilkan kalus remah/friable. Kurva pertumbuhan kalus membentuk kurva sigmoid dan memiliki 3 fase pertumbuhan yaitu fase lag (0-10 hari), fase eksponensial (10-50 hari), dan fase stasioner (50-60 hari). Tidak ada beda nyata dalam induksi kalus dan berat kering optimum kalus antar variasi medium. Senyawa bioaktif kalus didominasi oleh senyawa asam lemak yang sama seperti asam palmitat, asam oleat, dan asam adipat. Metabolit sekunder seperti *alpha-pinene* dan 1,8-*cineole* hanya terdeteksi pada ekstrak etil asetat kalus umur 40 hari yang ditumbuhkan di medium 1:0,5 dan 2:1 ekstrak etil asetat kalus umur 40 hari.

Kata kunci : jeruk purut, kalus, senyawa bioaktif, 2,4D (2,4-diclorophenoxy acetic acid), dan BAP (*Benzyl amino purine*)

## ABSTRACT

Kaffir lime (*Citrus hystrix* DC.) contains bioactive compounds that has potential to be used as herbal medicine. Bioactive compounds of kaffir lime were affected by external factors, therefore *in vitro* culture techniques was required to provide a controlled condition. Callus induction (callogenesis) was one of *in vitro* culture techniques that can be used to investigate plant metabolism such as the production of secondary metabolites. The objective of this study were to induce callus from kaffir lime seed in MS medium with combination of 2,4D (2,4-diclorophenoxy acetic acid) and BAP (Benzyl Amino Purine), to determine callus growth curve and analyze profile of bioactive compounds in kaffir lime callus. Callus were induced from seed embryos explants of kaffir lime on MS medium with combination of 2,4D and BAP with ratio 1:0,5; 1:1; and 2:1. Callus initiation time, percentage of callogenesis, callus biomass, and callus morphology were observed. The callus growth curve was obtained from callus biomass that measured every 5 days until 70 days of culture. Fourty and 60 days-old callus was extracted using chloroform and ethyl acetate then analyzed by GC-MS (Gas Chromatography-Mass Spectrometry) to determine the profile of callus bioactive compounds. The results showed that all of MS medium with combination of 2,4D and BAP were able to induce callus from seed explants of kaffir lime. Callus growth curve presented sigmoidal shape, with 3 phase that were lag phase occured in 0-10 day after inoculation (DAI), exponential phase (10-50 DAI) and stationary phase (50-60 DAI). Bioactive compounds were mostly derived from fatty acid such as palmitic acid, oleic acid, and adipic acid. Secondary metabolites such as *alpha-pinene* and *1,8-cineole* were identified on 40 days-old callus cultured in medium with combination of 2,4D and BAP 1:0,5 and 2:1 and extracted by ethyl acetate.

Keywords: kaffir lime, Callus, Bioactive compounds, 2,4D (2,4-diclorophenoxy acetic acid), dan BAP (Benzyl amino purine)