

## ABSTRACT

The development opportunity of medicinal plants cultivation is still very open broadly in line with the development of herbs industry, herbs medicine, phytopharmaca and traditional cosmetics. The role of biotechnology in cultivation, multiplication, genetically manipulation and screening of endophytic microbes that can produce secondary metabolites is very important for the development of drug substance derived from medicinal plants. The optimization process is considered very important in any microbes to produce metabolites massively. In the isolation study of antibacterial compounds from endophytic fungi DJ2, the yielded isolates are very low at only 0.0019% b/v.

This study aims to determine the effect of variation of fermentation conditions (type of media, carbon source, nitrogen source, temperature, pH and salinity) in order to obtain optimum condition on assay of bioactive compounds, total metabolites production and biomass production of fungal endophytic *Athelia (Sclerotium) rolfsii* (code DJ2). The weight of dried mycelium is calculated as the biomass product and supernatant dry weight of liquid-liquid extraction of media and ethyl acetate as total metabolites production while the levels of bioactive compounds were determined by TLC densitometry and isolates from the previous studies used as indicators.

The variation results on fermentation conditions were (1) the optimum conditions of relative level of bioactive compounds of endophytic fungi *Athelia (Sclerotium) rolfsii* were supplemented by the addition of sucrose, peptone, GDP media, pH 6.5, 27°C temperature and saline concentration of 3 grams/L; (2) Biomass production with supplementation of fructose, yeast extract, media SDB (Saboroud Dextrose Agar), pH 6 and 30°C; (3) The optimum conditions of total metabolites production dissolved in ethyl acetate were starch supplementation, beef extract, media TSB, pH 5.5 and a temperature of 25°C; and (4) The optimum fermentation conditions were able to produce productivity in larger quantities namely 0.0607% b/v; it was higher than conditions at basal medium with productivity 0.0078% b/v.

**Keywords:** endophytic *Athelia (Sclerotium) rolfsii*, fermentation conditions, biomass production, total metabolite production, relative level of bioactive compounds

## INTISARI

Peluang pengembangan budidaya tanaman obat-obatan masih sangat terbuka luas sejalan dengan semakin berkembangnya industri jamu, obat herbal, fitofarmaka dan kosmetika tradisional. Peranan bioteknologi dalam budidaya, multiplikasi, rekayasa genetika, dan skrining mikroba endofit yang dapat menghasilkan metabolit sekunder sangat penting dalam rangka pengembangan bahan obat yang berasal dari tanaman obat ini. Proses optimasi dianggap sangat penting dalam setiap mikroba untuk dapat menghasilkan metabolit secara besar-besaran. Pada penelitian isolasi senyawa antibakteri dari fungi endofit kode DJ2 ini, rendemen isolat yang dihasilkan sangat rendah yaitu hanya 0,0019%b/v.

Penelitian ini bertujuan mengetahui pengaruh variasi kondisi fermentasi (jenis media, sumber karbon, sumber nitrogen, temperatur, pH dan salinitas) untuk mendapatkan kondisi optimum pada penetapan kadar senyawa bioaktif, produksi metabolit total dan produksi biomassa fungi endofit *Athelia (Sclerotium) rolfsii* (kode DJ2). Bobot miselium kering dihitung sebagai produk biomassa dan bobot kering supernatan hasil ekstraksi cair-cair dari media dan etil asetat sebagai produksi metabolit total sedangkan kadar senyawa bioaktif ditetapkan dengan KLT densitometri dan isolat dari penelitian sebelumnya dijadikan indikator.

Hasil variasi pada kondisi fermentasi, kondisi optimum yang diperoleh adalah : Kondisi optimum kadar relatif senyawa bioaktif fungi endofit *Athelia (Sclerotium) rolfsii* adalah suplementasi dengan penambahan sukrosa, pepton, media PDB, pH 6,5, suhu 27°C dan konsentrasi salin 3 gram/L. Produksi biomassa dengan suplementasi fruktosa, yeast ekstrak, media SDB (*Saboroud Dextrose Agar*), pH 6 dan suhu 30°C. Kondisi optimum produksi metabolit total yang terlarut dalam etil asetat adalah dengan suplementasi starch, beef ekstrak, media TSB, pH 5,5 dan suhu 25°C Kondisi optimum fermentasi mampu menghasilkan produktivitas sebesar 0,0607%b/v lebih tinggi dibandingkan kondisi basal medium dengan produktivitas sebesar 0,0078%b/v.

**Kata Kunci** : endofit *Athelia (Sclerotium) rolfsii*, kondisi fermentasi, produksi biomassa , produksi metabolit total, kadar relatif senyawa bioaktif