PENGUJIAN KOMBINASI VARIABEL FAKTOR LINGKUNGAN KULTUR UNTUK MEDIA PRODUKSI SENYAWA ANTIJAMUR BAKTERI *Serratia plymuthica* UBCF_13/-R_36

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Abstrak

Pemanfaatan bakteri sebagai agen biokontrol telah banyak dilakukan, karena kemampuan produksi metabolit sekunder sebagai senyawa antijamur. Namun kendala yang dihadapi pada kondisi alami, produksi senyawa metabolit sekunder hanya dihasilkan dalam jumlah sedikit dan kondisi tertentu. Pengoptimalan faktor lingkungan kultur media dalam produksi senyawa antijamur yang diharapkan pada bakteri *Serratia plymuthica* UBCF_13/-R_36 perlu dilakukan. Pengoptimalan kondisi kultur media dilakukan melalui kombinasi empat variabel faktor lingkungan yakni pH 8, 2 % pepton, 1 mM $MnSO_4$, dan durasi kultur 8 jam. Penelitian ini bertujuan untuk memperoleh komposisi media yang optimal untuk media kultur bakteri. Penelitian ini menggunakan dua tipe aplikasi yakni supernatan bebas sel dan kultur sel. Hasil penelitian memperlihatkan, bahwa komposisi media kultur bakteri yang terbaik dari tipe aplikasi supernatan bebas sel diperoleh pada media pH 8, 1 mM $MnSO_4$, dan durasi 8 jam dengan persentase 17,80 %. Sementara untuk tipe aplikasi kultur sel diperoleh dari media dengan kombinasi pH 8, 2 % pepton, 1 mM $MnSO_4$, durasi 8 jam dengan persentase 44,53 %. Pengukuran konsentrasi protein total dan visualisasi gel SDS-PAGE memperlihatkan pita protein dengan berat molekul 38, 45, 54, dan 63 kDa. Pita protein tersebut diduga terlibat dalam regulasi ekspresi senyawa dengan aktivitas daya hambat.

Kata kunci: metabolit sekunder, *Serratia plymuthica* UBCF_13/-R_36, supernatan bebas sel, kultur sel, SDS-PAGE

STUDY ON THE COMBINATION OF ENVIRONMENTAL FACTOR VARIABLES FOR MEDIA USED IN THE PRODUCTION CULTURE OF ANTIFUNGAL COMPOUNDS FROM BACTERIA *Serratia plymuthica* UBCF_13 /-R_36

Abstract

The utilization of bacteria as a biocontrol agent has been widely carried out, due to the ability of the production of secondary metabolites as antifungal compounds. But the obstacles faced in natural conditions, the production of secondary metabolites are only produced in small amounts and in certain conditions. Optimization of environmental factors of media culture in the production of antifungal compounds expected in the *Serratia plymuthica* UBCF_13/-R_36 bacteria needs to be done. Optimization of the condition of media culture was done through a combination of four environmental factors variables namely pH 8, 2 % peptone, 1 mM $MnSO_4$, and 8 hours culture duration. This study was aimed to obtain the optimal media composition for bacterial culture media. This study used two types of applications namely cell-free supernatant and bacterial cell culture. The results showed that the best composition of bacterial culture media from the type of cell-free supernatant application was obtained at media pH 8, 1 mM $MnSO_4$, and 8 hours duration with a percentage of 17,80%. While for the type of cell culture application obtained from the media with a combination of pH 8, 2% peptone, 1 mM $MnSO_4$, duration of 8 hours with a percentage of 44,53%. Measurement of total protein concentration and visualization of SDS-PAGE gel showed significant results namely protein bands with molecular weights of 38, 45, 54, and 63 kDa. The protein band is thought to be involved in the regulation of the expression of compounds with inhibitory activity.

Keywords: secondary metabolites, *Serratia plymuthica* UBCF_13/-R_36, cell free supernatant, cell culture, SDS-PAGE