EKSPRESI merA ISOLAT *Streptomycetes* AS1 DAN AS2 PADA STRAIN *Escherichia coli* BL-21

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Intisari

Cemaran merkuri di lingkungan atmosfer, tanah, air tawar dan laut diketahui mengalami peningkatan yang signifikan. Upaya pengendalian sudah mulai dilakukan sejak 20 tahun lalu dengan berbagai pendekatan secara hayati, fisikawi maupun kimiawi. Salah satu upaya pengendalian secara hayati dilakukan dengan menggunakan agen mikrobia. *Streptomycetes* merupakan salah satu kelompok mikrobia yang diketahui mampu mendegradasi merkuri karena memiliki enzim merkuri reduktase. Gen merA adalah gen yang mengkode merkuri reduktase. Kloning gen merA isolat *Streptomycetes* AS2 (*accesion number* LC026157 dan LC026158) dan AS1 ke dalam vektor ekspresi pET-28c(+) telah berhasil dilakukan. Sekuen lengkap gen merA memiliki panjang 1456 bp. Ekspresi gen *mer*A isolat AS2 berhasil dilakukan dalam *host E.coli* BL-21, namun tidak untuk isolat AS1. Konfirmasi merkuri reduktase ditunjukkan dengan adanya *band* tebal dan spesifik pada SDS-PAGE dengan ukuran 55-70 kDa. Induksi IPTG optimal pada konsentrasi 1 dan 1,2 mM, sedangkan waktu inkubasi optimal pada 4 dan 18 jam. Aktivitas spesifik merkuri reduktase tertinggi terdapat pada *crude enzyme* sebesar 294,07 Unit/mg. Purifikasi merkuri reduktase menggunakan metode pengendapan ammonium sulfat, dialisis, dan kromotgrafi kolom belum dapat mempurifikasi merkuri reduktase secara optimal.

Kata kunci : ekspresi, merkuri reduktase, *E. coli* BL-21, SDS-PAGE

EXPRESSION OF merA FROM *Streptomycetes* AS1 AND AS2 ISOLATES INTO *Escherichia coli* BL-21

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Abstract

Mercury pollution in atmosphere, soil, fresh water and sea increase significantly. Efforts to control the mercury pollution have been done since 20 years ago using various biological, physical and chemical approaches. One of biological controls was done using microbial agent. *Streptomycetes* is one of microbial group was able to degrade mercury due to enzyme mercuric reductase. merA is encoding mercuric reductase. Cloning merA from *Streptomycetes* isolates AS2 (*Accesion number* LC026157 and LC026158) and AS1 in expression vector pEt-28c(+) have been done. Gene merA AS1 and AS2 are known having length of 1456 bp. Expression of merA from AS2 isolate has successfully performed in the host *E.coli* BL-21, but not in AS1 isolate. Detection of mercuric reductase using SDS-PAGE showed the dominant band in 55-70 kDa. *E. coli* BL-21 induction by IPTG was optimal at concentration of 1 and 1,2 mM, and optimal time incubation was 4 and 18 hours. The highest spesific activity of mercuric reductase was obtained at crude enzyme 294,07 Unit/mg. Purification of mercuric reductase using ammonium sulfate precipitation, dialysis, and column chromatography had not showed the ability for purifying the enzyme optimally.

Keywords: expression, mercuric reductase, *E.coli* BL-21, SDS-PAGE