KULTIVASI ANAEROB DAN IDENTIFIKASI FRAGMEN 396 pb (550-945) GEN 16S rRNA BAKTERI *Geobacillus thermoleovorans T4* ISOLAT SUMBER AIR PANAS GEDONG SONGO

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RINGKASAN

Bakteri termofilik *Geobacillus thermoleovorans T4* telah diisolasi dan diidentifikasi oleh Suprapti (2005) dalam kondisi aerob dari sumber air panas Gedong Songo. Kemampuan isolat bakteri untuk tumbuh dalam kondisi anaerob dan potensi penggunaan akseptor elektron oleh bakteri ini belum diketahui. Maka pada penelitian ini dilakukan kultivasi dan identifikasi kultur dalam kondisi anaerob dari isolat aerob *Geobacillus thermoleovorans T4.* Tujuan dari penelitian ini adalah untuk memperoleh isolat bakteri GS4 anaerob dan identitas fragmen 396 pb (550-945) gen 16S rRNA isolat bakteri serta membuktikan kemampuan reduksi bakteri terhadap ion sulfat dan besi (III).

Kultivasi anaerob dilakukan dengan media selektif untuk bakteri anaerob pereduksi sulfat. Identifikasi kultur meliputi analisis mikrobiologi, pengamatan temperatur optimum pertumbuhan bakteri dan analisis fragmen gen 16S rRNA. Identifikasi fragmen gen 16S rRNA dilakukan pada posisi yang berbeda dengan penelitian sebelumnya untuk melengkapi identitas gen 16S rRNA bakteri. Kemampuan penggunaan akseptor elektron ion sulfat dan besi (III) dianalisis secara kualitatif. Pengujian reduksi ion sulfat dilakukan dengan pengamatan pembentukan ion sulfida pada media. Sedangkan pengujian reduksi ion besi (III) dilakukan dengan mengganti ion sulfat sebagai akseptor elektron pada media dengan ion besi (III).

Hasil penelitian menunjukkan bahwa *Geobacillus thermoleovorans T4* isolat Gedong Songo bersifat aerob fakultatif, berbentuk batang dan berkarakter gram negatif dengan temperatur optimum pertumbuhan 70 ^{o}C. Identifikasi fragmen 16S rRNA pada posisi 550-945 menunjukkan homologi 95 % dengan *Geobacillus thermoleovorans T4.* Bakteri ini mampu mereduksi ion sulfat dan besi (III).

SUMMARY

A thermophilic bacteria isolate, *Geobacillus thermoleovorans T4*, was recovered and identified by Suprapti (2005) in aerobic condition from Gedong Songo hot spring. The ability of this isolate to grow in anaerob condition and the use of electron acceptors by this isolate has not been recovered. In order that, the study of cultivation and identification of the culture in anaerobic condition from aerobic isolate of *Geobacillus thermoleovorans T4* should be done. The aim of this study was to obtain an anaerobic bacteria isolate of *Geobacillus thermoleovorans T4* and to identify 396 bp (550-945) of 16S rRNA gene fragment as well as to prove the capability of the culture to reduce sulphate and ferric ions.

Anaerobic cultivation was conducted using selective medium for sulphate reducing bacteria. Culture identification included microbiology analysis, optimum growth temperature determination and 16S rRNA gene fragment analysis. The analysis of 16S rRNA gene fragment included DNA extraction, electrophoresis of DNA extract, *in vitro* amplification of the fragment using PCR, electrophoresis of amplified fragment, sequencing, and analyzing the resulted sequence. The identification of 16S rRNA gene fragment was performed at different position from the recent study to complete the identity of 16S rRNA gene of the isolate. The ability of the culture to use sulphate and ferric ions as electron acceptors were analyzed qualitatively. Sulphate reduction was tested by monitoring the formation of sulphide in medium. Ferric reduction was tested by substitution of sulphate with ferric as an electron acceptor in medium.

The study revealed that the isolate of *Geobacillus thermoleovorans T4* from Gedong Songo was facultatively aerobic, rod shaped with gram negative characteristic and grew optimally at 70 ^{o}C. Identification of 16S rRNA gene fragment at 550-945 positions showed 95% homology with *Geobacillus thermoleovorans T4*. This anaerobic isolate reduced sulphate and ferric ions.

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