Identifikasi bakteri berbasis Lab-On-Chip dari Mata Air Panas Cisolong Banten = Identification of Thermophilic Bacteria Isolated from Cisolong Hot Spring Banten based on Lab-On-Chip Technology

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Abstrak

Eksplorasi bakteri termofilik di Indonesia sangat penting untuk berbagai aplikasi industri. Penelitian ini bertujuan untuk identifikasi Gen 16S-rRNA dari bakteri termofilik yang terdapat di Mata Air Panas Cisolong, Banten. Ekstraksi dilakukan dengan dua metode yaitu komersial GeneAll® Exgene™ dan LOC ChipGenie® Edition P. Hingga saat ini, belum ada yang melakukan identifikasi bakteri dari mata air panas dengan menggunakan LOC untuk purifikasi DNA. Oleh karena itu, dalam penelitian ini dilakukan pengujian identifikasi bakteri dengan membandingkan kedua metode. Harapan kedepannya LOC dapat membantu purifikasi DNA secara langsung sehingga mempermudah identifikasi tanpa perlu di laboratorium.Penelitian selanjutnya juga akan dilakukan reverse engineering sehingga dapat membuat LOC sendiri. Variabel yang diujikan adalah hasil kemurnian, konsentrasi template DNA, dan identifikasi jenis bakteri. Purifikasi dilakukan dengan variasi jumlah kultur bakteri berdasarkan absorbansi agar dapat mengetahui jumlah bakteri optimum untuk LOC. Didapatkan hasil bahwa bakteri berhasil dipurifikasi menggunakan LOC pada variasi waktu kultur 4 dan 28 jam. Konsentrasi template DNA bakteri yang dihasilkan LOC juga baik dan dapat bersaing dengan kit komersial. Hasil PCR didapatkan bakteri sumber berada pada 1518 bp dan bakteri kolam 1422 bp. Bakteri berhasil diidentifikasi dengan BLAST dan berdasarkan pohon filogenetik, hubungan terdekat bakteri sumber yaitu Geobacillus kaustophilus strain BGSC 90A1 dan bakteri kolam yaitu Geobacillus thermoleovorans strain V0 chromosome.
.....Exploration of thermophilic bacteria in Indonesia is important for various industrial applications. This study aims to identify the 16S-rRNA gene from thermophilic bacteria found in Cisolong Hot Springs, Banten. Extraction was carried out by two methods, namely GeneAll® Exgene™ commercial kit and LOC ChipGenie® Edition P. To date, there has not yet been bacteria identification from hot springs using LOC for DNA purification. Therefore, in this study, a bacterial identification test carried out by comparing the two methods. The hope of this research is that in the future, LOC can be directly implemented in DNA purification, making it easier to identify without the need for laboratory procedures. In future research, reverse engineering will also be carried out so that we can make our own LOC. The variables tested were the results of DNA purity, templates concentration, and identification of the type of bacteria. Purification was also carried out by varying the number of bacterial cultures based on absorbance in order to determine the optimum number of bacteria for LOC. It was found that the bacteria were successfully purified using LOC at 4 and 28 hours of culture. The concentration yield of LOC is good and can compete with commercial kits. From the PCR results, it was found that the source bacteria were at 1518 bp and the pool bacteria at 1422 bp. Bacteria were identified by BLAST and based on the phylogenetic tree, the closest relationship to the source bacteria is Geobacillus kaustophilus strain BGSC 90A1 and the pool bacteria is Geobacillus thermolevorans strain V0 chromosome.