

## ABSTRAK

Fitri Arum Sasi. 24020111400003. Identifikasi Molekuler Bakteri Resisten Seng (Zn) Dari Sungai Banger Pekalongan. Dibimbing oleh Hermin Pancasakti K. dan Anto Budiharjo.

Sungai Banger merupakan salah satu sungai besar yang ada di Kota Pekalongan yang dimanfaatkan sebagai pengendali banjir dan tempat pembuangan limbah rumah tangga/domestik, kegiatan pertanian, industri makanan dan tekstil. Logam seng (Zn) banyak ditemukan di aliran sungai Banger akibat pencemaran. Penyerapan ion logam sangat penting untuk kelangsungan hidup bakteri di lingkungan yang tercemar. Ion logam diperlukan oleh bakteri dalam berbagai proses biologis yaitu sebagai komponen metalloprotein dan berfungsi sebagai kofaktor enzim. Namun, sangat penting bagi bakteri untuk memastikan bahwa serapan dan ketersediaan logam yang ada sesuai dengan kebutuhan fisiologisnya. Bakteri mempunyai strategi pertahanan terhadap toksisitas konsentrasi logam yang tinggi. Bakteri menggunakan serapan logam untuk mengatur homeostasis dengan berbagai regulator transkripsi, sehingga mereka dapat beradaptasi dengan perubahan kondisi lingkungan. Penelitian ini bertujuan untuk mengidentifikasi secara molekuler bakteri-bakteri yang resisten terhadap seng dari perairan yang tercemar. Bakteri diisolasi dan dimurnikan. Selanjutnya dilakukan isolasi DNA dari bakteri tersebut menggunakan *GeneJET Genomic DNA Purification Kit (ThermoScientific)*. Hasil isolasi DNA diamplifikasi menggunakan teknik PCR dengan primer *16S rRNA*. Berdasarkan hasil penelitian diperoleh 5 spesies utama bakteri yang resisten terhadap cemaran seng di sungai Banger. Kelima spesies yang dapat bertahan hidup pada kadar Zn sebesar 2000 ppm, dimana batas ambang resisten bakteri terhadap Zn hanya 5 ug/L. Kesimpulan penelitian ini adalah ditemukan lima spesies bakteri resisten terhadap Zn. Kelima spesies tersebut adalah *Enterobacter cloacae*, *Clostridium botulinum*, *Bacillus cereus*, *Enterobacter sp*, dan *Bacillus thuringiensis*.

Kata Kunci : bakteri resisten, Banger, logam berat, seng

## ABSTRACT

Fitri Arum Sasi. 24020111400003. Molecular Identification Of Zinc Resistant Bacteria From Banger River Of Pekalongan. This paper was supervisor by Hermin Pancasakti K. and Anto Budiharjo.

Banger River is one of the major river in Pekalongan city used as flood control and waste disposal for household/domestic wastes, agricultural activities, food and textile industries. Zinc (Zn) were found in the river due to the water pollution. Acquisition of metal ions is essential for survival in the environment or in their infected host. Metal ions are required in many biological processes as components of metalloproteins and serve as cofactors or structural elements for enzymes. However, it is critical for bacteria to ensure that metal uptake and availability is in accordance with physiological needs, as an imbalance in bacterial metal homeostasis is deleterious. Indeed, host defense strategies against infection either consist of metal starvation by sequestration or toxicity by the highly concentrated release of metals. To overcome these host strategies, bacteria employ a variety of metal uptake and export systems and finely regulate metal homeostasis by numerous transcriptional regulators, allowing them to adapt to changing environmental conditions. This study aim to molecularly identify bacterias that is resistant to zinc from polluted waters. Bacteria were isolated and purified. Then DNA isolation were conducted using *Gene JET Genomic DNA Purification Kit (ThermoScientific)*. The result of DNA isolation were amplification using PCR technique with 16S rRNA primer. Result of the study showed that there are 5 major species of bacteria that are resistant to Zinc pollution in Banger River. The fifth species that can survive in the levels of 2000 ppm, where the threshold of resistant bacteria of 5 ug/L Zn. Conclusion of the study is there are 5 bacteria that Zinc resistant were found. They are *Enterobacter cloacae*, *Clostridium botulinum*, *Bacillus cereus*, *Enterobacter sp*, and *Bacillus thuringiensis*.

Keyword: resistant bacteria, Banger, heavy metals, zinc