

## Intisari

Penelitian ini dilakukan dengan tujuan untuk mengetahui potensi kemampuan serta mekanisme bakteri *Sphingomonas* sp. dan *Pseudomonas* sp. dalam menurunkan konsentrasi logam tembaga (Cu<sup>2+</sup>) dalam medium pertumbuhan. Beberapa studi menunjukkan bahwa kedua bakteri tersebut berpotensi dipergunakan sebagai agen bioremediasi lingkungan tercemar logam tembaga (Cu<sup>2+</sup>). Penelitian sebelumnya juga menunjukkan bahwa kedua bakteri tersebut memiliki kemampuan menurunkan konsentrasi logam berat yaitu merkuri (Hg<sup>2+</sup>) yang merupakan logam transisi, sama seperti tembaga (Cu<sup>2+</sup>). Pengujian dilakukan dengan 3 metode utama yaitu pertama uji ketahanan masing-masing isolat bakteri terhadap Cu<sup>2+</sup> dalam medium pertumbuhan. Masing-masing isolat bakteri yang telah diketahui ketahanannya tersebut kemudian diuji kemampuannya dalam menurunkan konsentrasi Cu<sup>2+</sup> dalam medium. Setelah itu, dilakukan pengujian mekanisme penurunan konsentrasi Cu<sup>2+</sup> dengan menggunakan 3 perlakuan yaitu supernatan dipanaskan, supernatan tidak dipanaskan, dan sel rehat.

Berdasarkan pengujian pertama, diperoleh hasil bahwa kedua isolat bakteri tahan terhadap Cu<sup>2+</sup> hingga konsentrasi 50 ppm. Pengujian kedua memberikan hasil bahwa *Sphingomonas* sp. dan *Pseudomonas* sp. masing-masing dapat menurunkan konsentrasi Cu<sup>2+</sup> menjadi 12,38 ppm dan 16,57 ppm dari konsentrasi awal 21,6 ppm, namun penurunan tersebut masih lebih rendah apabila dibandingkan dengan kontrol. Perlakuan kontrol setelah inkubasi diketahui menurunkan konsentrasi Cu<sup>2+</sup> menjadi 6,26 ppm dari konsentrasi awal 21,6 ppm. Selanjutnya, pengujian ketiga memberikan hasil bahwa baik *Sphingomonas* sp. maupun *Pseudomonas* sp. justru memiliki kemampuan meningkatkan kelarutan Cu<sup>2+</sup> dalam medium.

**Kata kunci:** *Sphingomonas* sp., *Pseudomonas* sp., perubahan kelarutan, fosfat medium, logam tembaga (Cu)

### Abstract

This research was conducted with the aim of knowing the potential ability and mechanism of the bacteria *Sphingomonas* sp. and *Pseudomonas* sp. in reducing the concentration of copper metal (Cu<sup>2+</sup>) in the growth medium. Several studies have shown that these two bacteria have the potential to be used as bioremediation agents for copper (Cu<sup>2+</sup>) polluted environments. Previous research has also shown that these two bacteria have the ability to reduce the concentration of heavy metals, namely mercury (Hg<sup>2+</sup>) which is a transition metal, the same as copper (Cu<sup>2+</sup>). The test was carried out using 3 main methods, namely the first test of the resistance of each bacterial isolate to Cu<sup>2+</sup> in the growth medium. Each bacterial isolate whose resistance was known was then tested for its ability to reduce the concentration of Cu<sup>2+</sup> in the medium. After that, the mechanism for reducing Cu<sup>2+</sup> concentration was tested using 3 treatments, namely heated supernatant, unheated supernatant, and resting cells.

Based on the first test, it was found that the two bacterial isolates were resistant to Cu<sup>2+</sup> up to a concentration of 50 ppm. The second test gave the result that *Sphingomonas* sp. and *Pseudomonas* sp. each can reduce the concentration of Cu<sup>2+</sup> to 12.38 ppm and 16.57 ppm from the initial concentration of 21.6 ppm, but the decrease is still lower compared to the control. The control treatment after incubation was found to reduce the Cu<sup>2+</sup> concentration to 6.26 ppm from the initial concentration of 21.6 ppm. Furthermore, the third test gave the result that both *Sphingomonas* sp. and *Pseudomonas* sp. it has the ability to increase the solubility of Cu<sup>2+</sup> in the medium compared to the control.

**Keywords:** *Sphingomonas* sp., *Pseudomonas* sp., change in solubility, medium's phosphate, copper metal (Cu)