

CHAPTER V

CONCLUSION AND SUGGESTION

5.1 Conclusion

This investigation examines the capabilities of microbially induced carbonate precipitation (MICP) through ureolytic bacteria sourced from mangrove soil and water in Teluk Buo, Padang City, Indonesia, aimed at immobilising arsenic contamination. This study's findings reveal several significant aspects concerning the effectiveness of the bioremediation process.

1. Successful isolation and cultivation of ureolytic bacteria from mangrove soil and water samples;
2. The optimal arsenic concentration of 0.0058 g/L was demonstrated in tolerance and biomineralization tests, where ureolytic bacteria exhibited the best growth and maximum formation of CaCO_3 precipitation at this level. The CaCO_3 precipitation continued to increase until 48 hours, which was the final observation time in this study;
3. Real biocementation treatment demonstrated the potential of MICP in immobilizing arsenic, with mangrove soil showing a greater capacity in removing arsenic and producing 12,63% precipitation, making it a potential material for bioremediation.

5.2 Suggestion

Based on the research that has been done, some things that can be done for further research are:

1. Further studies should aim to optimize a wider range of arsenic concentrations and evaluate the effects of other heavy metals such as copper, manganese, or nickel on the biomineralization process;
2. Large-scale field tests are essential to validate laboratory findings and assess the practical feasibility of applying MICP in real-world conditions. These tests will also ensure the long-term stability of arsenic immobilization;

3. Further research into the microbial diversity in mangrove soil will enhance the understanding and effectiveness of the bioremediation process, improving its efficiency in dealing with various types of heavy metal contamination;
4. It is recommended to repeat each test multiple times to ensure the reliability and reproducibility of results. Repetition will help to account for experimental variability and strengthen the findings of the research.

