The Response of Wetland Plants to the Geochemical Conditions of Discharged Water from Nickel Mining Operations in Eastern Indonesia

Mining industries have developed significantly for the last two decades including in Indonesia. In nickel laterite mines, the wastewater can potentially contain chromium, including hexavalent chromium, which is toxic to biota. On the other hand, the environmental management is not simple and cheap. Therefore, discovering a technology for treating contaminated mine water, that is inexpensive and effective for the mining industry, is important. Several studies concluded there is a possibility of chromium reduction in mine drainage passing through certain wetland systems.

The purpose of this research project was to identify the essential wetland conditions determining the success of chromium removal from the discharged waters at nickel laterite mines in tropical climates of Indonesia. In a wetland, three main components are found; namely the plants, the sediment and the water, all responding to environmental conditions.

Two native macrophytes were tested in mesocosm wetland and it was found that Machaerina rubiginosa (Spreng.) T. Koyama (Fam. Cyperaceae) performed better than others in removing chromium from mine water. Other aspects of wetlands, such as the residence time and type of wetland matrix were critical in the efficiency of the chromium removal.

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