

**PENGARUH SERBUK GERGAJI KAYU AKASIA (*Acacia mangium* Willd)  
DAN ZEOLIT ALAM TERHADAP AKTIVITAS ISOLAT BAKTERI  
PEREDUKSI SULFAT DALAM REDUKSI LOGAM Mn**

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**INTISARI**

Bakteri Pereduksi Sulfat (BPS) merupakan agen bioremediasi limbah yang mengandung sulfat dan logam mangan (Mn). Aktivitas BPS dapat ditingkatkan dengan penambahan sumber karbon seperti serbuk gergaji kayu akasia (*Acacia mangium* Willd). Konsentrasi sulfat dan logam Mn tinggi diperlukan metode untuk mengimobilisasi BPS pada substrat seperti zeolit. Penelitian dilakukan skala *batch culture* menggunakan media *Postgate B* dengan konsentrasi sulfat 100 ppm dan Mn 10 ppm pada pH 4,00. Metode analisis data menggunakan Rancangan Acak Lengkap (RAL), perlakuan yang diberikan yaitu pemberian zeolit sebesar 20 gr/L sedangkan kadar serbuk gergaji sebesar 0%;1,25%; 2,5% dan 5%. Parameter yang diamati yaitu pH, kecepatan reduksi sulfat, kecepatan reduksi Mn, dan karakter sel BPS. Analisis data menggunakan Annova dan uji *Duncan New Multiple Range Test* (DNMRT) pada taraf 5%. Hasil penelitian *batch culture* menunjukkan serbuk gergaji kayu akasia berpengaruh sangat nyata terhadap perubahan pH. Pemberian serbuk gergaji meningkatkan pH menjadi 6,5-6,9. meningkatkan Kadar serbuk gergaji 2,5% yang paling optimal meningkatkan efisiensi reduksi sulfat sebesar 63,90% dan efisiensi reduksi Mn sebesar 54,80%. Konsorsium BPS memanfaatkan selulosa serbuk gergaji yang ditandai terbentuknya zona bening disekitar koloni. Luas diameter zona jernih berpengaruh terhadap kecepatan reduksi sulfat dan logam Mn. Hasil penelitian isolat BPS genus *Desulfovobrio sp.* menunjukkan penambahan serbuk gergaji kayu akasia meningkatkan aktivitas reduksi sulfat dan Mn. pH isolat SKK3 adalah 6,81 sedangkan isolat QKK3 mencapai 6,90. Efisiensi reduksi sulfat isolat QKK3 sebesar 56,96% sedangkan isolat SKK3 mencapai 68,04%. Efisiensi reduksi Mn isolat SKK3 sebesar 41,32% sedangkan isolat QKK3 mencapai 53,92%. Berdasarkan analisis SEM menunjukkan paparan logam Mn tidak merusak dinding sel bakteri sehingga bakteri tidak terjadi lisis.

Kata kunci: Serbuk gergaji , Zeolit, Bakteri Pereduksi Sulfat (BPS), Mangan (Mn)

**THE INFLUENCE OF ACACIA WOOD SAWDUST  
(*Acacia mangium* Willd) AND NATURE ZEOLITE TOWARDS THE  
ISOLATE ACTIVITY OF SULFATE REDUCING BACTERIA IN Mn  
METAL REDUCTION**

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**ABSTRAK**

Sulfate Reducing Bacteria (SRB) is a bioremediation agent of waste containing sulphate and manganese (Mn). SRB activities can be enhanced by the addition of carbon sources such as *Acacia mangium* Willd. High sulfuric and metallic concentrations of Mn are required to immobilize SRB on substrates such as zeolites. The study was conducted on batch culture scale using Postgate B media with sulphate concentration of 100 ppm and 10 ppm Mn at pH 4.00. Data analysis method using Completely Randomized Design (CRD), treatment given that is zeolite by 20 gr / L while the concentration of sawdust by 0%, 1,25%; 2.5% and 5%. Parameters observed were pH, sulfate concentration, Mn concentration, and SRB cell character. The difference between treatment were analyzed using Anova, followed by Duncan New Multiple Range Test (DMRT) at 5% level to locate the difference. Result of batch culture study showed that Acacia sawdust had very significant effect on pH change. The amount of sawdust causes increasing the pH to (from 4 to 6.5-6.9). The most optimum level of sawdust 2.5% increased sulfate reduction efficiency 63.90% and Mn reduction effectiveness 54.80%. The SRB consortium utilizes a sawdust cellulose characterized by a clear zone around the colony. The width of the clear zone diameter affects the speed of sulfate reduction and Mn. The results of the isolate SRB study of the genus *Desulfovobrio sp.* Showed the addition of Acacia sawdust increased the activity of sulfate and Mn reduction. pH of SKK3 is 6,81 whereas QKK3 reaches 6,90. Efficiency of sulfate reduction of QKK3 was 56,96% while, SKK3 isolate was 68,04%. The reduction efficiency of Mn SKK3 is 41,32% while QKK3 isolate reach 53,92%. Based on SEM analysis shows exposure to manganese doesn't damage the cell wall of bacteria so bacteria don't occur lisis.

Keywords: Acacia Sawdust, Zeolite, Sulfate Reducing Bacteria(SRB), Manganese