

## INTISARI

Penelitian ini dilakukan dengan tujuan untuk mengetahui pengaruh formula inokulan bakteri pengoksidasi besi dalam memperbaiki kualitas air buangan, pertumbuhan dan produksi padi di lahan sulfat masam. Penelitian ini dilaksanakan di rumah kaca serta laboratorium Balittra di Banjarbaru, Kalimantan Selatan pada bulan Juli sampai Nopember 2017. Rancangan yang digunakan dalam penelitian ini adalah rancangan acak kelompok (RAK) faktorial 3 faktor dan diulang sebanyak 3 ulangan. Faktor pertama inokulan (T) dengan macam formula inokulan, yaitu: (1)  $T_1$  = Tanpa formulasi, (2)  $T_2$  = Arang kayu, (3)  $T_3$  = Arang sekam, (4)  $T_4$  = Inokulan bakteri pengoksidasi besi + arang kayu, dan (5)  $T_5$  = Inokulan bakteri pengoksidasi besi + arang sekam. Faktor kedua adalah pengelolaan air (P) yaitu : (1)  $P_1$  = Sistem tertutup ( air dikembalikan ) dan (2)  $P_2$  = Sistem terbuka (air tidak dikembalikan). Faktor ketiga adalah bahan fitoremediasi (A) yaitu: (1)  $A_1$  = Purun tikus dan (2)  $A_2$  = Bulu babi.

Hasil penelitian menunjukkan bahwa pemberian inokulan dengan bahan pembawa arang kayu dan pengelolaan air sistem terbuka dengan tanaman purun tikus sebagai bahan fitoremediasi dapat meningkatkan hasil gabah sebesar 34,71 %, dibandingkan tanpa pemberian inokulan. Kualitas air buangan terbaik adalah dengan perlakuan  $T_4P_1A_1$  (formula inokulan + arang kayu, pengelolaan air tertutup dan bahan fitoremediasi purun tikus) dengan nilai pH 5,02, Eh 51,1 mV dan TDS sebesar 276 ppm. Konsentrasi Fe air buangan dengan perlakuan inokulan bakteri pengoksidasi besi + arang sekam hanya sebesar 9,750 mg.kg<sup>-1</sup> yang lebih rendah dibandingkan perlakuan inokulan bakteri pengoksidasi besi + arang kayu sebesar 10,060 mg.kg<sup>-1</sup>.

Kata kunci : Bakteri pengoksidasi besi, Kualitas air buangan, Produksi padi, Sulfat masam, Fitoremediasi

## Abstract

This research was conducted with the aim to know the effect of inoculant formula of iron oxidizing bacteria in leachate water quality improvement, growth and production of rice in acid sulphate land. This research was conducted in greenhouse and laboratory of Balittra in Banjarbaru, South Kalimantan from July to November 2017. The design used in this research was factorial randomized block design (RAK) 3 factors and repeated as many as 3 replications. The first factor of inoculant (T) with various inoculant formulas, namely: (2) T2 = wood charcoal, (3) T3 = husk charcoal, (4) T4 = Inoculant bacteria of oxidizing iron + wood charcoal, and (5) T5 = Inoculant bacteria of oxidizing iron + husk charcoal. The second factor was water management (P): (1) P1 = Closed system (water returned) and (2) P2 = Open system (water not returned). The third factor was phytoremediation material (A) those were: (1) A1 = Purun tikus (*Eleocharis dulcis*) and (2) A2 = Bulu babi (*Eleocharis retroflaxa*).

The results shows that giving of inoculant with wood charcoal carrier material and open water system management with Purun Tikus plant as phytoremediation material can increase grain yield by 34.71%, compared with no inoculant. The best quality of leachate water is by using the treatment of T<sub>4</sub>P<sub>1</sub>A<sub>1</sub> (inoculant formula+ wood charcoal, closed water management and phytoremediation of purun tikus) with pH value 5,02, Eh 51,1 mV and TDS 276 ppm. Concentration of leachate water Fe in treatment of inoculant of iron oxidizing bacteria + husk charcoal only amounts to 9,750 mg.kg<sup>-1</sup> which is lower than inoculant treatment of iron oxidizing bacteria + wood charcoal 10,060 mg.kg<sup>-1</sup>

Keywords: Iron oxidizing bacteria, leachate water quality, Paddy production, Sulfur Acid, phytoremediation.