OB4

Effects of Biofertilizer on Yield and Quality of Rice (*Oryza sativa* L.)

Mohammad Kamrul Bhuiyan[1], Kim Man Keun[1],
Mintah Lemuel Ohemeng[1], Tae Kwon Shon[1], and Sang Chul Lee*
[1]Department of Agronomy, Kyungpook National University, Daegu 702-701, Korea

Objectives

The objectives of this study are to investigate the effects of biofertilizer on growth, yield and quality of rice (*Oryza sativa* L.).

Materials and Methods

Time and Place of Study:	Chilgok Agricultural Research & Extension Services, Summer 2004
Rice Variety Used:	Junambyeo produced by Rural Development Administration (RDA)
Biofertilizer Used:	Biofertilizer provided by the Korean Forest Research Institute (KFRI)
Experimental Design:	Random Complete Block Design with 3 Replicates
Parameters:	Growth Characteristics, Yield Components and Rice Quality
Treatments:	Recommended fertilizer rate, RF: N-P2O5-K2O (11-5.5-4.8 kg $10a^{-1}$), Half of the Recommended Fertilizer Rate, HRF: N-P2O5-K2O (5.5-2.75-2.8 kg $10a^{-1}$), HRF combined with biofertilizer 250 kg $10a^{-1}$, HRF combined with biofertilizer 500 kg $10a^{-1}$, No fertilizer, Biofertilizer 250 kg $10a^{-1}$, Biofertilizer 500 kg $10a^{-1}$

Results

1. Results of the agronomic characteristics obtained in HRF combined with Biofertilizer 500 kg $10a^{-1}$ measured from 40 to 80 days after transplanting showed comparable plant height (98.2 cm) tiller number (15.5) and superior chlorophyll content (38.2 SPAD units) compared to those obtained in the RF treatment. The measured root activity and leaf area index of the plants in HRF plus Biofertilizer 500 kg $10a^{-1}$ showed statistically similar results with those obtained in RF treatment.

2. The same trend was observed in the yield components which resulted to high rice yield obtained in HRF combined with Biofertilizer 500 kg $10a^{-1}$ (727.6 Kg) against that obtained in RF treatment (684.2 Kg).

3. In case of quality, only amylose content obtained in HRF combined with Biofertilizer 500 kg $10a^{-1}$ was low but protein content, palatability test and alkaline digestion value were highest among the treatments. Phytic acid content obtained in HRF plus Biofertilizer 500 kg $10a^{-1}$ was also similarly comparable with that obtained in the RF treatment.
4. Likewise, the obtained values in antimutagenicity were high in HRF plus Biofertilizer 500 kg $10a^{-1}$ compared to that obtained in RF treatment. Also, in the case of antioxidant activity, the values obtained in HRF plus Biofertilizer 500 kg $10a^{-1}$ were also comparable with Vitamins C and E.

Address : e-mail : leesc@knu.ac.kr Phone : 82-950-5713

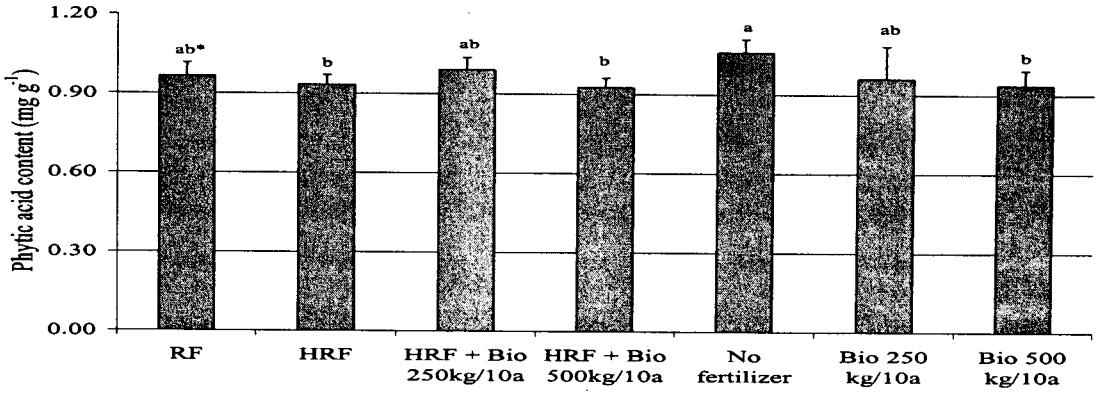

Figure 1. Effects of the levels of bio-and NPK-fertilizers on phytic acid content.
The same letters in each column are not significantly different at 5% level by DMRT.

Table 1. Effects of the levels of bio-and NPK-fertilizers on antimutagenicities of 70% ethanol extracts of rice-bran with mitomycin C using *E. coli* PQ 37 as an indicator cell.

Treatment	Antimutagenicity (%)		
	20 mg mL^{-1}	50 mg mL^{-1}	100 mg mL^{-1}
RF	100	100	100
HRF	0	0	0
HRF + Bio 250	96	88	78
HRF + Bio 500	128	103	92
No fertilizer	89	96	90
Bio 250 kg	98	106	115
Bio 500 kg	104	95	113

The same letters in each column are not significantly different at 5% level by DMRT.

Table 2. Effects of the levels of bio-and NPK-fertilizers on electron donating ability from rice.

Treatment	Electron donating ability (%)		
	20 mg mL^{-1}	50 mg mL^{-1}	100 mg mL^{-1}
RF	22.2 ± 5.6a	56.0 ± 12.7a	87.8 ± 2.6a
HRF	32.5 ± 8.5a	58.1 ± 7.0a	84.3 ± 1.5ab
HRF + Bio 250	25.5 ± 2.0a	53.1 ± 3.4a	84.6 ± 1.5ab
HRF + Bio 500	28.3 ± 2.2a	54.1 ± 8.4a	83.2 ± 3.2ab
No fertilizer	25.8 ± 9.1a	49.5 ± 2.4a	84.7 ± 2.1ab
Bio 250 kg	21.2 ± 7.9a	51.2 ± 7.4a	81.5 ± 4.3b
Bio 500 kg	28.2 ± 11.4a	61.9 ± 3.7a	85.7 ± 1.8ab
Vit. C		91.4 ± 1.8	
Vit E		89.7 ± 1.3	
BHT		90.2 ± 1.5	

The same letters in each column are not significantly different at 5% level by DMRT.