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Effect of Nitrification Inhibitors on Yield and Yield Attributes of T. Aman Rice Varieties

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A pot experiment was carried out in the greenhouse at Bangladesh Agricultural University, Mymensingh, during the T. aman season of July to November, 2011 to investigate the effect of natural [methyl 3-(4-hydroxyphenyl) propionate (MHPP)] and synthetic [3, 4-dimethylpyrazole phosphate (DMPP)] nitrification inhibitors on yield and yield attributes of three T. aman rice cultivars (BINA dhan7, BRRI dhan39 and BR11). The three concentrations of both natural and synthetic nitrification inhibitors were 0, 100 and 250 μ M. The experiment was laid out in two factorial completely randomised design where each treatment was replicated three times. Nitrification inhibitors were applied as foliar spray at 15, 30 and 55 DAT. The results of the experiment revealed that both natural and synthetic nitrification inhibitors have positive effect in increasing the yield and yield contributing characters of T. aman rice cultivars by reducing the N loss from soil and supply nitrogen in steady state throughout the growing season. The cultivar BR11 showed better response to the nitrification inhibitors than the other varieties. The use of both natural and synthetic inhibitors at a concentration of 250 μ M showed increase in the number of tillers per hill, number of filled grains, 1000-grains weight, grain yield, and harvest index (%) because there is a steady uptake of nitrogen throughout the growing season. Nitrogen content in rice grains, straw and soil was found to be significantly higher in treatments where both natural and synthetic nitrification inhibitors were used than other treatments. From this experiment it can be concluded that methyl 3-(4-hydroxyphenyl) propionate has positive effect in inhibiting the nitrification process in soil which is similar to the recognised synthetic nitrification inhibitor DMPP when considering the yield and yield contributing characters of rice varieties. As DMPP is an expensive NI, MHPP which is produced from the sorghum root exudates can be used instead as an alternative. If the rice-sorghum-rice cropping pattern is followed, rice plant can grow with lesser amount of nitrogen supply compared to the recommended dose in the soil.

Keywords: *Nitrification inhibitors, root exudates, T. aman.*