

The effect of calcium silicate as foliar application on aerobic rice blast disease development.

ABSTRACT

The bio-efficacy of calcium silicate as foliar application in enhancing physical barrier mechanism against *Pyricularia oryzae* in aerobic rice was investigated. A blast-partially resistant cultivar, MR219-4 and a resistant cultivar MARDI Aerob 1 were cultivated under aerobic conditions with foliar application of calcium silicate at 3, 6 and 9 mg/L. Foliar application of calcium silicate at 9 mg/L indicated the highest rice blast disease reduction for both cultivars, MR219-4 (89.21%) and MARDI Aerob 1 (97.87%). Scanning Electron Microscope (SEM) with energy dispersive X-ray (EDX) demonstrated that MARDI Aerob 1 has uniform distribution on the dumbbell shape of silica bodies in leaf epidermis compared with MR219-4 where there was a fractured on the dumbbell shape with non-uniform distribution of silica dumbbell bodies. Besides, MARDI Aerob 1 has significantly higher Silicon (Si) weight (34.49%) compared with MR219-4 (18.29%). Both rice cultivars exhibited significant increases in Si deposition for plant treated with calcium silicate through foliar application, especially when *P. oryzae* was inoculated. The Si content in rice leaf shown a consistence result with the Si distribution. However, the lignin content in Si-treated rice plant was significantly increased only with *P. oryzae* inoculation. MARDI Aerob 1 demonstrated higher lignin content (0.74%) compared with MR219-4 (0.60%) for Si-treated and *P. oryzae* inoculated treatment. This study revealed that foliar application of calcium silicate at 9 mg/L enhanced the resistance of aerobic rice against *P. oryzae* infection through accumulation and fortification of Si in the epidermal cell wall and increased lignin content in the leaf.

Keyword : Calcium silicate; Foliar application; Rice blast disease; *Pyricularia oryzae*; Aerobic rice.