Saponin-based nanoemulsion as a natural fungicide for control rice dirty panicle disease

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Abstract: Fungal pathogen is a major cause of rice disease resulting in a decline of rice production yield. In Thailand, the dirty panicle disease of rice is one of the severe problems of rice production. Therefore, disease controlling is very necessary and beneficial to enhance the rice production yield. In this study, we developed the natural fungicide-emulsion for the control of the fungi involving in dirty panicle disease. We have extracted saponin (14-18% yield), an antifungal agent derived from tea seed pomaces (Camellia oleifera Abel). Oil-in-water saponin based nanoemulsions were prepared. The hydrodynamic size of emulsions was characterized by dynamic light scattering method (DLS). Antifungal activity was tested on plate against two major fungi causing dirty panicle disease in Thailand including virulent strains of Curvularia lunata and Bipolaris oryzae. The inhibition effect of nanoemulsion was also examined in fungal-infected seeds. Moreover, the tested was performed by spraying on fungal-infected rice plants in the greenhouse. As a result, our emulsion showed inhibition effects in the control of the fungi. The significant inhibition effects were found in the infected seeds and in the greenhouse which emulsion can control the disease up to 90%.

Keywords: Dirty panicle disease; Emulsion; Fungicide; Saponin