

Transformation of Sabah Traditional Rice for Combating Blast Disease

ABSTRACT

The worldwide paddy production including the Sabah traditional rice is affected by blast disease which is caused by *Magnaporthe oryzae* fungal infection, resulting in a reduction of 10-30% rice yield annually. Pathogenesis-related class 4 protein such as the wheatwin2 (*wwin2*) has been reported to significantly defend against a soil-borne fungi infection in tobacco plants, but the capability of this protein against *M. oryzae* infections in rice is unclear. Therefore, this study aimed to construct a plasmid containing the *wwin2* gene and transform it into the Sabah traditional rice genome to combat blast disease. In brief, the *wwin2* gene was synthesized and integrated into a vector using Gateway cloning technology and was transformed into the Sabah traditional rice genome via an *Agrobacterium*-mediated approach. This study exhibited a promising high transformation rate with more than 90% of the transformed rice calli were expressing the reporter marker, GUS. The *wwin2* gene expression in the transformed rice calli was further confirmed using quantitative real-time polymerase chain reaction. In summary, this study constructed a vector containing the *wwin2* gene with a high transformation rate and capable of consistently expressing GUS and *wwin2* in the transformed Sabah traditional rice calli. Subsequent analyses are needed to verify the defense mechanism of the *wwin2* protein towards rice blast disease.