ABSTRAK

Fusarium oxysporum f.sp *cubense* Tropical Race 4 (Foc TR4) merupakan patogen virulen penyebab hilangnya hasil pisang *Cavendish* akibat infeksi di seluruh area tanam. Beberapa tahun terakhir, mekanisme interferensi RNA (RNAi) menggunakan *micro*RNAs (miRNAs) menjadi fokus penelitian mengenai interaksi antara tanaman dan patogen, serta pengembangan alternatif ramah lingkungan dalam pengendalian patogen. Penelitian ini, menggunakan analisis ekspresi gen dan pendekatan analisis *in silico* pencarian kandidat miRNA (mac-miR156m) menggunakan website seperti miRBase, TarDB, dan psRNAtarget. mac-miR156m yang disintesis kemudian diaplikasikan kedalam koloni jamur dengan penetesan menggunakan mikropippet, dilihat morfologi serta analisis ekspresi gen target pada jamur Foc TR4. Hasil pemberian mac-miR156m terlihat lebih menekan pada sporulasi jamur sebesar 66,8% pada konsentrasi 20 ng/µl dan 75,7% pada konsentrasi 20 ng/µl dibandingkan diameter koloni dengan penghambatan sebesar 4,45% dan 4,43% pada konsentrasi 20 dan 50 ng/µl selama 20 hari pengamatan. Penurunan ekspresi relatif gen target pada konsentrasi 20 ng/µl ARB 95 % (19,56 kali), LETM 94% (16,06 kali), PM 89% (8,78 kali) dan SIX1C 62% (2,67 kali) menurunkan ekspresi gen lebih baik dibandingkan konsentrasi 50 ng/µl. Pola ekspresi miRNA yang ditentukan dengan metode kuantifikasi menunjukkan bahwa miRNA memainkan peran penting dalam patogenisitas Foc TR4.

Kata Kunci: Interference RNA, microRNA, mac-miR156m, Foc TR4

ABSTRACT

Fusarium oxysporum f.sp cubense Tropical Race 4 (Foc TR4) is a virulent pathogen that causes loss of Cavendish banana yield due to infection throughout the planting area. In recent years, RNA interference (RNAi) mechanisms using microRNAs (miRNAs) have become the focus of research on interactions between plants and pathogens, as well as the development of environmentally friendly alternatives for controlling pathogens. This research uses gene expression analysis and an in silico analysis approach to search for candidate miRNAs (mac-miR156m) using websites such as miRBase, TarDB, and psRNAtarget. The synthesized mac-miR156m was then applied to fungal colonies by dripping using a micropippet, looking at the morphology and analysis of target gene expression in the Foc TR4 fungus. The results of administering mac-miR156m appear to suppress fungal sporulation by 66.8% at a concentration of 20 ng/µl and 75.7% at a concentration of 20 ng/µl compared to colony diameter with inhibition of 4.45% and 4.43% at the concentration 20 and 50 ng/µl for 20 days of observation. Decreased relative expression of target genes at a concentration of 20 ng/µl ARB 95% (19.56 times), LETM 94% (16.06 times), PM 89% (8.78 times) and SIX1C 62% (2.67 times) reduced gene expression better than a concentration of 50 ng/µl. The expression patterns of miRNAs determined by quantification methods indicate that miRNAs play an important role in the pathogenicity of Foc TR4.

Key Words: Interference RNA, microRNA, mac-miR156m, Foc TR4