

INTISARI

Kekeringan merupakan salah satu cekaman abiotik dalam budidaya tanaman tebu karena dapat menyebabkan penurunan produktivitas. Dalam studi ini, dua karakter yang diamati untuk mengamati mekanisme pertahanan tanaman terhadap kekeringan yaitu karakter morfologi dan molekuler. Respon molekuler tanaman yang diamati berperan dalam meningkatkan kemampuan tanaman ketika menghadapi cekaman kekeringan melalui peningkatan ekspresi gen *Dehydration Responsive Element Binding* (DREB). Studi ini bertujuan untuk mengkarakterisasi tebu yang memiliki ketahanan terhadap cekaman kekeringan menggunakan analisis *reverse transcription quantitative polymerase chain reaction* (RT-qPCR) dengan menargetkan gen DREB. Di PT Gunung Madu Plantations, terdapat dua varietas koleksi yang digunakan yaitu K1 dan K2 yang selanjutnya diberi perlakuan penyiraman sebagai simulasi cekaman kekeringan. Pengambilan sampel dilakukan pada 0, 7, 14 hari setelah perlakuan cekaman dan 7 hari setelah perlakuan *recovery*. Dari kedua varietas yang diamati, K1 menunjukkan respon morfologi kekeringan daun lebih tinggi daripada K2 selama masa cekaman. Respon molekuler ekspresi gen DREB menunjukkan bahwa K2 memiliki tingkat ekspresi gen yang lebih tinggi ketika cekaman kekeringan daripada varietas K1. Respon morfologi dan molekuler kembali seperti perlakuan kontrol ketika dilakukan *recovery*. Hasil studi ini dapat disimpulkan bahwa tebu K1 tergolong varietas rentan terhadap kekeringan, sedangkan K2 cenderung lebih toleran terhadap kekeringan.

Kata kunci: tebu; cekaman kekeringan; DREB; RT-qPCR

ABSTRACT

In sugarcane, drought is one of the abiotic stresses since it can lead to a decrease in its productivity. In this study, two characteristics were observed to examine the plant's defense mechanisms against drought: morphological and molecular traits. The molecular response of the plants plays a role in enhancing their ability to cope with drought stress by increasing the expression of the Dehydration Responsive Element Binding (DREB) gene. This study aims to characterize sugarcane with drought resistance using reverse transcription quantitative polymerase chain reaction (RT-qPCR) analysis targeting the DREB gene. At PT Gunung Madu Plantations, two collection varieties were used, namely K1 and K2, which were subjected to watering treatments as a simulation of drought stress. Sampling was conducted at 0, 7, and 14 days after the stress treatment and 7 days after the recovery treatment. Among the two varieties observed, K1 showed a higher morphological response to drought stress in leaves compared to K2 during the stress period. The molecular response in DREB gene expression indicated that K2 had a higher gene expression level under drought stress than variety K1. Both morphological and molecular responses returned to control levels after recovery treatment. The results of this study conclude that K1 is classified as a drought-sensitive variety, while K2 tends to be more drought-tolerant.

Keywords: sugarcane; drought stress; DREB; RT-qPCR