ABSTRAK

Benih yang disimpan dalam jangka waktu yang lama dapat mengalami kemunduran yang dapat dilihat dari penurunan viabilitas benih selama proses penyimpanan. Pengujian viabilitas standar menggunakan uji perkecambahan yang bersifat destruktif. Mendasarkan pada kenyataan bahwa penurunan viabilitas adalah proses fisiologis, pendekatan-pendekatan non destruktif menggunakan marka perlu ditelusuri potensinya. Penelitian ini dilakukan untuk menunjukkan perubahan senyawa-senyawa metabolit pada benih jagung dengan kondisi sehat dan dengan kondisi mundur. Perubahan profil metabolit dapat digunakan untuk mendukung hasil analisis pada aras lain dan memberikan gambaran perubahan fisiologi-molekuler. Penelitian dilaksanakan pada Maret 2023 hingga Agustus 2023 di Laboratorium Genetika dan Pemuliaan Tanaman, Teknologi Benih, dan Analisis Instrumentasi Departemen Teknik Kimia. Benih yang digunakan yaitu benih jagung lokal Dieng. Terdapat dua ulangan pada setiap cawan petri yang berisi 50 benih yang dikecambahkan. Kondisi jagung yang digunakan yaitu: jagung sehat dan jagung yang telah mengalami proses kemunduran. Pada kondisi jagung yang telah mengalami proses kemunduran diambil tiga kategori kecambah: kecambah normal, kecambah abnormal, dan jaringan dari butiran tidak berkecambah, sedangkan pada kondisi jagung sehat diambil dua kategori kecambah yaitu kecambah normal, dan kecambah abnormal. Kombinasi dari kedua kriteria menghasilkan unit percobaan sebanyak lima cuplikan. Profil metabolit embrio jagung pada kondisi sehat dan mundur menghasilkan kelompok senyawa karboksilat format, propionat, oksalat, asetat, dan palmitat, sedangkan senyawa non-karboksilat yang dihasilkan yaitu antioksidan, lactone, ethanol, keton, acetone, dan fenol. Kemunduran embrio jagung mempengaruhi produksi beberapa metabolit di antaranya adalah naiknya asam karboksilat seperti asetat, menurunnya palmitat, serta menurunnya kelompok non-karboksilat seperti antioksidan.

Kata kunci: benih, jagung, kemunduran, metabolit

ABSTRACT

Seeds that are stored for a long period of time can experience deterioration, which can be seen from the decrease in seed viability during the storage process. Standard viability testing uses destructive germination tests. Based on the fact that viability reduction is a physiological process, non-destructive approaches using markers need to be explored for their potential. This study was conducted to show changes in metabolite compounds in maize seeds with healthy conditions and with deteriorated conditions. Changes in metabolite profiles can be used to support analytical results at other levels and provide an overview of physiological-molecular changes. The research was conducted from March 2023 to August 2023 at the Laboratory of Genetics and Plant Breeding, Seed Technology, and Instrumentation Analysis of the Department of Chemical Engineering. The seeds used were Dieng local maize seeds. There were two replicates in each petri dish containing 50 germinated seeds. The condition of the maize used are: healthy maize and maize that has undergone a process of deterioration. In the deteriorated maize condition, three categories of sprouts were taken: normal sprouts, abnormal sprouts, and tissue from ungerminated grains, while in the healthy maize condition, two categories of sprouts were taken: normal sprouts, and abnormal sprouts. The combination of the two criteria resulted in an experimental unit of five samples. The metabolite profile of maize embryos in healthy and regressed conditions produced carboxylic compounds formate, propionate, oxalate, acetate, and palmitate, while the non-carboxylic compounds produced were antioxidants, lactone, ethanol, ketone, acetone, and phenol. The deterioration of the maize embryo affects the production of several metabolites including an increase in carboxylic acids such as acetate, a decrease in palmitate, and a decrease in non-carboxylic groups such as antioxidants.

Keyword: seed, maize, deterioration, metabolite