

EFFECTS OF WATER DEFICIT ON THE SPECIFIC ACTIVITIES
OF ANTIOXIDATIVE ENZYMES IN *Zea mays*

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EFFECTS OF WATER DEFICIT ON THE SPECIFIC ACTIVITIES OF
ANTIOXIDATIVE ENZYMES IN *Zea mays*

By
Nurul Hanani Abu Samah

A thesis submitted in partial fulfillment of
the requirement for the award of the degree of
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PROJEK PENYELIDIKAN I DAN II
RESEARCH REPORT VERIFICATION**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **EFFECTS OF WATER DEFICIT ON THE SPECIFIC ACTIVITIES OF ANTIOXIDATIVE ENZYMES IN *Zea mays*** oleh **NURUL HANANI BINTI ABU SAMAH**, no. matrik: **UK12232** telah diperiksa dan semua pembedaan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh ijazah **SARJANA MUDA SAINS (SAINS BIOLOGI)**, Fakulti Sains dan Teknologi, Universiti Malaysia Terengganu.

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DECLARATION

I hereby declare that this thesis entitled **Effects of Water Deficit on the Specific Activities of Antioxidative Enzymes in *Zea mays*** is the result of my own research except as cited in the references.

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ABSTRACT

Water deficit is a common problem and this affect plants' physiological function and lead to the reduction of crop production. Plants develop various reactions to overcome this problem especially by producing antioxidants. A study was conducted to determine the effects of water deficit on the activities of antioxidative enzymes; catalase (CAT), peroxidase (POD) and ascorbate peroxidase (APX) in maize. Seven days old maize plants were treated with different volume of water (0ml, 20ml, 40ml, 60ml, 80ml and 100ml). The treatment was conducted for 11 days and antioxidative enzyme assays were carried out at 0, 1, 2, 3, 5, 7 and 11 days of treatment. The results showed that, under water deficit, the activities of APX and CAT in leaves increased while for POD, the activities increased at early stages but declined at the later stages of the experiment. It can be concluded that the major reactive oxygen species (ROS) scavenging enzyme is APX and CAT. Despite this fact, all the three enzymes actually coordinated with each other in maintaining the balance between useful and harmful ROS and co-regulated in overcoming stress condition.

ABSTRAK

Masalah kekurangan air sering terjadi dan ini memberi kesan terhadap fungsi fisiologi tumbuhan seterusnya mengurangkan pengeluaran hasil tanaman. Bagi mengatasi masalah ini, tumbuhan menghasilkan pelbagai tindak balas terutamanya penghasilan antioksidan. Kajian telah dijalankan untuk mengkaji kesan kekurangan air terhadap aktiviti spesifik enzim antioksidan iaitu katalase (CAT), peroksida (POD) dan askorbat peroksida (APx) di dalam pokok jagung. Pokok jagung berusia tujuh hari disiram dengan isipadu air yang berbeza (0ml, 20ml, 40ml, 60ml, 80ml dan 100ml). Rawatan dilakukan selama 11 hari dan aktiviti spesifik enzim ditentukan pada 0, 1, 2, 3, 5, 7 dan 11 hari rawatan. Hasil kajian menunjukkan bahawa di dalam keadaan kekurangan air, aktiviti APx dan CAT meningkat manakala aktiviti POD meningkat pada peringkat awal dan menurun pada peringkat akhir rawatan. Ini menunjukkan bahawa APx dan CAT merupakan enzim utama dalam menghapuskan spesis oksigen reaktif. Walau bagaimanapun, koordinasi antara ketiga-tiga enzim diperlukan untuk memastikan keseimbangan antara spesis oksigen reaktif yang diperlukan dan yang berbahaya serta pengawalaturannya untuk mengatasi keadaan tegaran.